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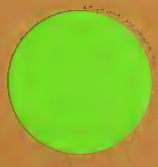
A National Study of Resource-Based Relative Value Scales for Physician Services

Volume 4

Results and Conclusions of the Resource-Based Relative Value Study

Listing of Final Resource-Based Relative Values for Surveyed Procedures

Reference List



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A NATIONAL STUDY OF RESOURCE-BASED RELATIVE VALUE SCALES FOR PHYSICIAN SERVICES

FINAL REPORT

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--- Data not available
... Category not applicable
- Quantity zero

Chapter 12

Results and Conclusions of the Resource-Based Relative Value Study

12.1 Introduction

The current system of compensating physicians for their services is based on customary, prevailing and reasonable (CPR) charges. It has been criticized as inflationary and complex, and as tending to retain distorted charges. Many physicians also criticize CPR payment rates as irrational, inequitable, and possibly leading to abuse.

The objectives of this study were to develop reliable and valid methods for measuring resource-based relative values (RBRVs) and to produce RBRVs for physicians' services in 18 specialties. The resource-based relative value scale (RBRVS) is an index of the relative levels of resource input spent when physicians produce services or procedures. It is denominated in nonmonetary units; if it were used to establish a fee schedule, the resource-based relative values would have to be multiplied by a monetary conversion factor (dollars per unit). Though detailed discussion of how to establish a conversion factor is outside the scope of this study, we offer some comments on what a conversion factor must take into account.

To measure the resource costs of physicians' services and procedures (hereafter called simply services), we developed a model that measures three resource inputs: (1) the work expended on a particular service, encompassing time spent before, during, and after a service, and the intensity with which that time is spent; (2) practice costs; and (3) the opportunity costs of training. Work is service-specific; practice costs and

opportunity costs are specialty-specific.

These factors combine to produce the resource-based relative value of a given medical service:

RBRV = (TW) (1 + RPC) (1 + AST) (Equation 1)

where

TW = total work by the physician,

RPC = index of relative specialty practice costs, and

AST = index of amortized value of opportunity cost for specialized training

The RBRVS, modified or unmodified, could serve to:

- identify aberrant charges.
- establish fee schedules based on codes derived from Physician's Current Procedural Terminology, 4th ed. (CPT-4).
- establish payment rates for services packaged differently from CPT-4, such as by episode of illness.
- provide a basis for negotiation between payers and physicians.
- provide a measurement of work performed, to serve as a basis for establishing salary levels in HMOs.

Resource-based relative values might well be significantly different from charge-based relative values, producing fees that differ from current charges and altering physicians' economic incentives. Such a change in incentives might influence physician practice patterns, though how strong an influence it

would exert is still unresolved and vigorously debated. At least theoretically, total health-care costs could be reduced by an alteration of physicians' practice patterns.

12.2 Summary of Methods and Data

The development of an RBRVS is a complex undertaking. Because the resource costs of performing physicians' services have several components, the development of the RBRVS was a multi-step process. The methods, data, and results for each step are presented in separate chapters which appear in this report. To acquaint the reader with the developmental segments of this study, this chapter presents a brief overview of the steps.

We developed vignettes that described physician services. We classified these services drawn according to CPT-4, which identifies more than 7,000 distinct services and procedures, taking into account variations in levels of service to patients of varying complexity and severity. Though the work of a given specialty may encompass several hundred of these codes, a far smaller number typically accounts for the bulk of the workload.

We partitioned total work into pre-, intra-, and post-service phases. Otherwise, a highly complex cognitive process would have been necessary to directly estimate the work of a composite service, since the durations and intensities of these three phases often differ markedly. Furthermore, billing conventions vary regarding pre- and post-service work. When the three phases of total work are measured separately, they can be

bundled differently for payment purposes.

We first selected approximately 23 services in each specialty, studied them in depth, and obtained the ratings of the intra-service work they involve from a national survey of 3,200 physicians. We then estimated the work performed during the pre- and post-service phases. Next, because each specialty rated relative work on its own scale, we had to develop a process and a quantitative method of aligning all the ratings on a common scale.

We then developed a method of extrapolating the work values for the services studied in depth to a much larger group of services. We identified small, homogeneous families of services as the basic units for the extrapolations and assumed that charges represent reasonable indicators of relative work within such families. We first selected a service from a family and considered this service as a benchmark service. The total work value for the benchmark service was obtained from the national survey. Next, we calculated the ratios of charges between the benchmark service and other nonsurveyed services in the same family. To produce extrapolated work values within each family, we multiplied the estimated work value for a benchmark service by these charge-based ratios for the other nonsurveyed services in the same family.

Fifth, we calculated an index of specialty-specific practice costs -- the relative proportion of physicians' gross income spent on practice costs in different specialties. Lastly,

the opportunity costs (forgone income) of postgraduate medical training were calculated, using the duration of residency in each specialty.

The model we developed for the resource-based relative value scale is: RBRVs = (TW) (1+AST) (1+RPC). We presented the estimates of total work for the 407 services we had surveyed in Chapter Seven. (See Table 73.) The RBRVs can be derived by multiplying the values of total work by the index of the relative practice cost factors (see Table 85) and by the index of relative opportunity cost factors (see Table 87).

12.3 Results

12.3.1 Overall Results

Table 90 presents the total service work and RBRVs for the services we surveyed in 18 specialties. The resource inputs required by different medical and surgical services vary widely: there is at least a forty-fold difference across the services studied in depth by this investigation. Within a given specialty, too, there is wide variation in RBRVs, though the range is narrower for medical specialties than for surgical specialties.

Table 90 also presents the ratings of intra-service work and of pre- and post-service work for each service. These ratings appear separately to highlight the relative proportions of total work each represents. Though medical practitioners are aware that much of their time and effort are spent before and after

performing a given service for a patient, there has heretofore been no systematic study of pre- and post-service work. The results presented in Table 90 show that pre- and post-service work account for a significant fraction of total resource input, particularly in invasive services. The pre- and post-service work represent close to 50 percent of the total work of invasive services, and 33 percent of evaluation/management.

Table 91 presents our findings for two medical and two surgical specialties, including a comparison of RBRVs with charges. For hospital-based surgical services, the RBRVs reflect the resource cost only from the day of hospital admission to the day of discharge.* The intra-service and the pre-/post-service work are presented separately to show the proportion of work performed during the different phases. The RBRVs are compared with 1986 mean Medicare Part B charges. The ratios of charges-to-RBRVs are presented in column 5. These ratios show how the relative relationship of current charges differs from relative resource costs.

To further examine variations in the charges-to-RBRVs ratios within a given category of services, we selected several frequently performed services in each category (evaluation and

---

* A percentage of surgeons bill a "global" fee that encompasses both the pre-admission office visit and post-hospital discharge visits. The RBRVs do not reflect these office visits.

management, invasive, imaging, and laboratory) and computed their charges-to-RBRVs ratios. We used 1986 Medicare mean charge data and data from the 1986 Florida Relative Value Scale (RVS), which is based on charges, for comparison. We can first examine the variations in the ratios in Table 92 within a given category of service. For most evaluation and management services, the ratios range from 0.2 to 0.5. For most hospital-based invasive services, the range is greater than 1.0.

We can also examine whether a general pattern exists in the ratios of charges-to-RBRVs between categories of service. The typical ratio for hospital-based invasive services is approximately 1.0, compared to 0.31 for evaluation and management services (intermediate or extended office visit). Services performed by radiologists have typical charges-to-RBRVs of about 1.0, while pathology has a ratio of 0.6.

Table 93 shows summary statistics for intra-service work, time, and work per unit of time for the four categories of services and anesthesia services. The table shows physicians vary widely in the amount of time and work required for different services. More importantly, work per unit of time ranges very widely, from 1.4 to 19.4. (Work per unit of time can be interpreted as an implicit measure of intensity when time is held constant.) Within evaluation and management services, the work per unit of time varies within a range of 1.6 to 6.1. In anesthesia, laboratory, and imaging services, work per unit of time varies two- to three-fold. Invasive services, however,

exhibit much greater variation in work per unit of time -- a more than ten-fold difference, where the levels of difficult among services are known to differ greatly. Moreover, mean work per unit of time is much lower for evaluation and management services than for invasive procedures; in fact, the mean work per unit of time for evaluation and management is less than one-half that for invasive services. These results strongly suggest that the values of work we obtained in our study have captured both time and the intensity of work.

We designed the study so that the RBRVs of different categories of services could be compared in two ways: vertically and horizontally. The vertical approach involves selecting services within a specialty. Thus, without having to establish links across specialties, we can develop RBRVs for different categories of services and compare their relative resource inputs. For example, we can compare the RBRVs for appendectomy and surgeon's office visit, the work of which are both rated by general surgeons. The horizontal approach involves a linking process. After linking the services of different specialties from all service categories and putting them on a common scale, we can again compare the relative value of services in different categories. For example, we can compare an invasive service such as an appendectomy, rated by general surgeons, with an office visit to a specialist in internal medicine. The horizontal and vertical approaches allow us to check the consistency of the RBRVs between categories, produced through two different methods.

The results are presented in Table 94.

Results in Table 94 show that the two different approaches produced very consistent RBRVs. We use Medicare mean charges as a reference point for comparing the results of the two approaches in the table. Before the linking process, the average ratio of charges-to-RBRVs for the four evaluation and management services and the four invasive services in general surgery are 0.56 and 1.66 respectively. This represents a 296 percent (i.e., 1.66 divided by 0.56) difference between the two categories of services. After the relative values of eighteen specialties are aligned on a common scale, we compare average ratio of charges-to-RBRVs for the four routine evaluation and management services performed by family practice and internal medicine with the four invasive services performed by general surgery. There is a 303 percent (i.e., 1.06 divided by 0.35) difference between the two categories of services. The two different methods produced very similar results in the ratios of charges-to-RBRVs for two categories of services. Thus, our conclusion that the ratios of charges-to-RBRVs vary systematically between categories of services is valid regardless of whether we use the linkage process.

12.3.2 Analysis of Results for Evaluation and Management Services

We analyzed the ratings of work for evaluation and management services and found they follow a closer relationship

to time than do those of invasive services. Table 95 shows that the ratings of work per minute of individual evaluation and management services cluster quite closely around the mean for the services. The mean work per minute for evaluation and management services was 3.2, with a standard deviation of 0.7 and a range of 1.6 to 6.1 units of work per minute. In contrast, as shown in Table 93, the mean work per unit time (W/T) for invasive procedures was 7.1 with greater dispersion (S.D. 3.3) and range (1.9 to 19.4). Laboratory and imaging services had mean values of W/T closer to that for evaluation and management services and vary over comparable ranges.

The results in Table 95 suggest that the mean work per minute by site and function of evaluation and management service differs minimally. Other than telephone services and post-operative hospital services, which show higher average ratings of work per minute than do office, consultative, and nursing home services, the mean values for all other types are within one standard deviation of the mean (0.6) for office services. While telephone services have a high value of W/T, the small number of such services surveyed precludes generalization. Note, too, that the data on the different types of services reflect ratings in a variety of specialties and may reflect differences based on the specific evaluation and management services selected. Importantly, for each type of service the range of W/T across specialties is narrow and usually varies by less than two-fold. The work of evaluation and management services is highly

correlated with time.

Table 96 shows work per minute of evaluation and management services for different specialties. Although the results represent small numbers of different services and different mixes of types of services across specialties, the relatively stable ratio of work to time within and across specialties again suggests that the ratings of work closely follow time. Mean values range from a low of 2.3 (Ophthalmology) to a high of 3.9 (Cardiovascular/Thoracic Surgery, Orthopedic Surgery), with a median value of 3.2.

We can examine the use of billing codes for evaluation and managemnet services using the data on intra-service work, time, and work per unit of time. Table 97 shows the mean intra-service times from the survey for the subset of office, hospital, and consultation vignettes that had been coded the same by TCG panelists in two or more specialties. The table shows the various specialties use the most frequently billed codes (i.e., limited (CPT 90050), intermediate (CPT 90060), and extended service (CPTs 90017 and 90070) similarly with respect to the time spent for each. For example, the intra-service times estimated by all specialties for intermediate office visits, established patient (CPT 90060), fall between 16 and 20 minutes.

However, Table 97 shows large differences in the time spent for services encompassed by codes for comprehensive office and hospital services (CPT 90020, 90220) and complex initial consultations (CPT 90630). The mean time for a comprehensive

office service for a new patient (CPT 90020) varies widely over a more than two-fold range for the 12 specialties surveyed (range: 25-60 minutes); the time for an initial complex consultation (CPT 90630) varies nearly three-fold.

Moreover, we found further systematic differences in the way physicians in different specialties understand and use the coding system. For example, the times estimated by rheumatologists exceed those given by dermatologists by approximately two-fold for the two evaluation and management codes, comprehensive office service for a new patient (90020) and limited office service for an established patient (90050)

Ratings of work for this same subset of commonly coded vignettes appear in Table 98. As might be anticipated from the relatively small range in work per minute for these services across specialties, these ratings continue to show the same pattern of differences as those for time when the same codes are used by different specialties. Thus, the time and work input show large and systematic differences across specialties for comprehensive and complex consultative services.

The use of billing codes also varies considerably within specialties, as seen in Table 99. Although we asked our consultants to choose average patients for a given service, the limited choice and ambiguity of codes, as well as our iterative process of coding, resulted in certain instances in which several surveyed vignettes within a specialty fell under the same code. Thus, we can look, albeit selectively, at how much work and time

vary within a code and specialty. Note that recoding of vignettes after the survey to remove rank-order anomalies within specialties reduced variation within the codes.

Table 99 shows that for the majority of cases, the work and time of vignettes assigned the same codes within a specialty are reasonably close to each other. The estimated work for such vignettes generally differ by less than 20 percent; thus, each vignette differs from the average for the code by less than 10 percent. The median pair of vignettes for all the 35 codes with multiple vignettes presented in Table 99 shows an 18 percent difference in intra-work, and each vignette deviates by $\pm$ 8.5 percent from the average. However, the work and time of a few vignettes that were coded the same vary almost two-fold, and ratings of work deviate from the average for the code within the specialty by up to $\pm$ 32 percent. Office services to advise a patient regarding the removal of wisdom teeth and office services for a smoker with an ulcer on the tongue (coded 90015), varied 1.9-fold in work and 1.1-fold in time. Two consultation services (evaluation and plan for management of a multiple trauma patient and emergency consultation for a 72-year-old with possible bowel obstruction) coded 90630 varied 1.8-fold and 1.3-fold for work and time respectively.

12.3.3 Extrapolation of Work for Evaluation and Management Services

Our results for evaluation and management services suggest

problems for the extrapolation of work for this category of services.

Table 100 shows the total work values for surveyed evaluation and management services in 15 specialties for selected families of closely related codes. Examination of the total work values shows several features that indicate problems with the methodology for assigning RBRVs to specific codes for evaluation and management services services. The results show: (1) large differences in total work within some codes rated by more than one specialty and (2) a rough progression of total work for services across codes, within some families of closely related codes. Further, our efforts to extrapolate to unsurveyed services within these specialties disclosed additional problems. In this section, we describe in greater detail these problems and the shortcomings in methodology that may have led to them. We suggest follow-up investigation for possible solutions in assigning RBRVs to evaluation and management services in section 12.5.2.

One underlying feature of our method was that, in surveying physicians on the work they perform, we used vignettes describing patients or procedures rather than in terms of billing codes, such as CPT-4 codes, "limited office service." We followed this approach for two reasons. First, we believed that physicians would be better able to respond in terms of work and its dimensions (such as mental effort, technical skill, or stress) to such vignettes than to the language of billing codes and that

they would be less likely to be influenced by existing fee structures than if we used the language of coding. Second, in practice, the logical sequence for a physician is to examine and treat a patient with a given condition, then select a billing code that is appropriate for the service rendered. We believe our approach should follow the natural sequence of physician practice.

The strength of our approach is that we were successful in focusing on work. As discussed in chapters 4 and 5, physicians within a specialty were in close agreement in their ratings of work, time, and the other dimensions of work for the surveyed services. Moreover, as shown in this chapter, the relative ratings of work differed from the relative relationship of existing charges, indicating that physicians are able to rate work independently of charges. Another important finding is that the ratio of work to time showed little variation. Regardless of the type of evaluation and management services service, the site at which it is performed, or the specialty performing it, work per unit time varies only slightly.

The weaknesses of our methodology for evaluation and management services apply particularly to the system of coding for these services. We discovered considerable ambiguity in the description of the services covered by particular evaluation and management billing codes. In addition, there appear to be large variations in coding/billing practices between specialties. Finally, the accuracy of the charge data for evaluation and

management services currently available for use in extrapolation is limited. These three problems have proven to be so severe that we have not been able to extrapolate successfully to non-surveyed services on a specialty-specific basis.

The sections below elaborate on these weaknesses.

12.3.3.1 Ambiguity of Evaluation and Management Billing Codes and Uncertainty in Mapping Services to Billing Codes

In comparison to evaluation and management services, vignettes can be mapped with relative confidence to billing codes for invasive, imaging, and laboratory services. Because the definitions of codes for these services are more specific and many codes are available, it is easier to describe an average patient problem for a code. By contrast, the definition of codes for evaluation and management services are more ambiguous and allow for considerable variation in how they are interpreted. We mapped our vignettes to billing codes using an iterative process that involved our Technical Consulting Group consultants and experts in billing codes.

Our iterative approach to this task entailed the following steps. First, we asked the two to five members of each specialty's Technical Consulting Group to designate the appropriate code for each vignette and to review these in subsequent written communications. Secondly, we submitted all vignettes and their coding for review by the Division of Health Policy and Program Evaluation of the AMA, the group responsible

for development and maintenance of the CPT-4 coding system. The codes chosen by the AMA unit sometimes differed from those of the panelists. In such cases, the investigators assigned the codes that they believed to be most applicable. Thirdly, a review following the national survey revealed some clear rank-order anomalies. For example, a vignette classified by the panelists as a limited office service (90050) might have received significantly higher ratings of work and time than a service in the same specialty classified as an intermediate office service (90060). In these cases, we recoded the vignettes in each specialty, matching vignettes within each family of closely related codes with billing codes that preserved the ascending sequence of work embodied in the definitions. We did not, however, attempt to adjust codes across specialties to create a common pattern. Following all these steps, we resubmitted the codes within each specialty for review by the Technical Consulting Groups and the AMA and then made the final coding decisions.

The result of this process is the mapping of data on work to CPT-4 codes, based on the opinions of coding experts, Technical Consulting Group panelists, and the investigators. However, we do not know how physicians billing for the services described in the vignettes would have coded them. Moreover, the process of post-survey recoding to correct rank-order anomalies serves to reduce the variation in work within codes.

Nevertheless, we found it difficult to assign work values

(on which RBRVs are based) reliably to evaluation and management services codes, even within specialties. We have analyzed empirical evidence that gives a lower bound to the possible extent of variation in work, based on multiple vignettes within codes.

We have presented data for 35 instances in which 2 or more surveyed vignettes within a specialty fell under the same code in Table 99. As described above, we can look, albeit selectively, at how work and time vary within a code and specialty. We found that the median pair of vignettes for all the 35 codes with multiple vignettes surveyed showed an 18 percent difference in intra-work, and each vignette deviates by $\pm$ 8.5 percent from the average. However, the work and time of a few vignettes that were coded the same vary almost two-fold, and ratings of work deviate from the average for the code within the specialty by up to $\pm$ 32 percent. As a result, the RBRV of a given code is very sensitive to the vignette used in the survey.

Further evidence for this sensitivity may be seen in Table 100. There is a lack of smooth progression within some families of closely related codes. For example, RBRVs differ by more than 2-fold in Pediatrics for limited (90050) and intermediate (90060) office services for established patients. Our pediatric consultants reported that these values were clearly inconsistent with each other and with their understanding of the average relationship of work between these codes. In their view, the work of the vignette for the limited service (90050) was correct

but represented the lower part of the range of work for the code while that for the intermediate service (90060) was also correct but represented the higher part of the range of work for that code. By contrast, RBRVs in allergy/immunology for limited (90050) and intermediate (90060) services differed by only 10 percent while those for intermediate and extended (90070) differed by two-fold.

12.3.3.2 Large Variation in Coding/Billing Practices between Specialties

Table 97 showed large differences in the time spent for services encompassed by codes for comprehensive office and hospital services (CPT 90020, 90220) and complex initial consultations (CPT 90630). Moreover, using the time data, we found further systematic differences in the way physicians in different specialties understand and use the coding system. The ratings. The ratings of work in Table 98 showed a similiar pattern of differences as those for time when the same codes are used by different specialties.

Table 100, although it has many empty cells, affords further examples of large differences in total work between specialties for the same code. The total work for 90017 ranges from 90 (dermatology) to 144 (obstetrics/gynecology). That for 90020 ranges from 118 (dermatology) to 302 (psychiatry). The total work for 90250 varies from 52 (general surgery) to 120 (thoracic/cardiovascular surgery). These differences in total

work generally parallel differences in estimates of time. The differences appear to be a result of differences in the way these codes are used and understood in different specialties.

12.3.3.3 Problems in Extrapolation

Given the large differences between specialties in total work for the same evaluation and management services codes, we have explored the possibility of developing specialty-specific RBRVs for evaluation and management services service codes. In attempting to develop specialty-specific RBRVs, however, we were confronted by several problems. First, our data base of surveyed evaluation and management services services in each specialty is limited, with as few as two in ophthalmology and oral/maxillofacial surgery, three in otolaryngology, four in thoracic/cardiovascular surgery, and five in orthopedics and urology. Second, we do not have a reliable base of specialty-specific charge data for extrapolation to unsurveyed codes. Claim data on a specialty-specific basis are limited for many of these codes. Some specialties do not use all the codes. Further, charges in some specialties may not reflect differences in physicians' work input. In allergy/immunology, for example, charges for office visit codes may reflect a significant factor for inputs by ancillary personnel who perform tests or administer treatment.

In attempts to extrapolate to unsurveyed evaluation and management services codes (not shown), we have found the

following anomalies:

1. High extrapolated values for brief, limited, and intermediate services for new patients in the following specialties (allergy and immunology, general surgery, otolaryngology, pediatrics, rheumatology, thoracic surgery, urology, and obstetrics and gynecology) and for this series of office services in established patients for oral/maxillofacial surgery.

2. Extrapolation from surveyed services produced values for comprehensive office services in family practice, internal medicine, pediatrics, and oral/maxillofacial surgery that were lower for new patients than for established patients.

3. Extrapolated RBRVs were lower for four out of five codes for new patient office services for internal medicine than for Family practice. This is in conflict with the experience of Technical Consulting Group panelists and with published data on times for office services for these specialties.

These problems for evaluation and management services could have resulted either from shortcomings in the ability to map surveyed vignettes to codes, the extrapolation process, including the use of unreliable charges for these services, or both. We further discuss the limitations of our methods for these services and the need for further research in section 12.5.2.

12.3.4 Analysis of Results for Invasive Services Performed in Hospitals

Table 101 presents the estimated work of selected hospital invasive services. These relative work values are based on a common scale, derived from our cross-specialty method; the data are shown specialty by specialty. We found ratings of intra-operative work for all services to be reliable. The standard errors of the ratings of intra-operative work, reported as a percentage of the mean, typically ranged from 4 to 10 percent. We found the standard errors were lower for invasive services than for all other categories.

Table 101 also shows the intra-operative portion of physician work accounts for roughly 50 to 65 percent of total work for most invasive procedures. These percentages range from 27 percent for a chest-tube insertion for a spontaneous pneumothorax to 69 percent for a total cystectomy and ileal loop.

It is interesting to compare these percentages with those for time. Table 101 further includes time data for the same procedures. The intra-operative phase usually accounts for 25 to 40 percent of the total time, but comprises 50 to 65 percent of total work. This difference reflects differences in the intensity of work per unit of time between the intra-operative period and the periods before and after it. The intra-operative period involves much more intense work than the time spent on diagnosis, evaluation, and management of a patient during the pre- and post-operative periods.

Work per unit of time varies over a wide range for surgical procedures. Table 102 shows the range of work per unit of time

for each specialty. We compare these values for hospital invasive procedures with data for invasive procedures in surgical center and office settings. The work per unit of time ranges from 4 to 17. Within a specialty, work per unit of time for the intra-operative period varies by as much as 50 percent from one procedure to another. For ophthalmological procedures, work per unit of time varies three- to four-fold. These values can be compared with those for other categories and settings.

The average work per unit of time for a typical office visit to an internal-medicine specialist ranges from 2.6 to 3.2, with an average of 2.9. Work per unit of time for the majority of invasive services is two to three times that of evaluation and management services. In specialties such as ophthalmology, orthopedic surgery, and urology, work per unit of time for a hospital invasive procedure can be as much as five to six times that of a typical office service.

Among the 55 surgical procedures examined in this section, the ratios of mean current charges to RBRVs are far from constant. As Table 103 shows, the ratios for these services range from 0.42 to 2.32, a five-fold difference, and for most services range from 0.60 to 1.80, a three-fold difference. This range of values implies that relative charges do not necessarily reflect relative resource costs.

In examining the ratios of the top and bottom 20 percent of the 55 procedures, we discerned no general pattern by type of procedure. Nor do the ratios seem to be related to work per unit

of time. Among the 12 highest-ratio procedures, however, four are largely performed by thoracic surgeons; and four are performed by specialists in obstetrics and gynecology.* Three of the 12 lowest-ratio procedures are largely performed by urologists, three are by general surgeons, and the remaining eight are spread among various specialties.

We examined each specialty to determine where their procedures tend to fall in different ranges of charge-to-RBRV ratios. We designated three ranges of charge-to-RBRV ratio, labelling them high (ratios of 1.20 and above), medium (1.19 to 0.91), and low (0.90 and below), and grouped our 55 procedures into these ranges. The in-hospital procedures of two specialties tend to fall into the high group: thoracic surgery and obstetrics and gynecology. Five thoracic surgeons' procedures are in the high group; all but two of the remaining six are in the middle group. Obstetrical and gynecological procedures are

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* The ratios of charges-to-RBRVs should be interpreted with some caution. The RBRVs are calculated based on the assumption that medical malpractice premiums paid by a physician are spread to all procedures performed. If physicians, in setting their fees, assign their malpractice premiums only to certain high risk procedures, such as Cesarean sections, then these charges would be greater than if physicians had spread the premium to all procedures. That would partly explain these high charge-to-RBRV ratios for the procedures with high rates of litigation.

in the high group; the one exception is in the middle group. All but two of the eight urologists' procedures are in the low-ratio group.

In order to ascertain the reasonableness of the RBRVs, we compared them with Ontario fees. There is no "gold standard" against which we can externally validate the RBRVS; thus, various approaches have to be devised to assess the face validity of our results. Since the early 1970s, Canadian provincial fee schedules have been established through negotiation. (Reinhardt 1984) Each year, the provincial government negotiates with the provincial medical association on an expected aggregate sum to be paid out in the following year for physician services. After agreement is reached, the medical association convenes representatives of the major specialties to negotiate a uniform and equitable fee schedule among themselves. A major criterion is that fees be equitable compensations of work performed for various services. (Fraser 1987) We selected Ontario for purposes of comparison because it is Canada's largest province, where one-half of the Canadian population resides. The relativity among the fees for various services in the Ontario fee schedule is also quite representative of other provincial fee schedules. (Korcock 1975) We hypothesize that, as a result of this negotiation process, the relative fees from Ontario better reflect the relative resource costs of physician services than the current relative charges from the U.S..

We calculated the ratios of Ontario fees to RBRVs and

examined whether there is any consistent pattern in the ratios. The results are presented in Table 104. We selected for comparison five frequently performed evaluation and management services, nine invasive services, and two and five commonly performed services in pathology and radiology, respectively.

We evaluated the face validity of the RBRVS by comparing RBRVs with Ontario fees. Unlike the ratios of Medicare charges-to-RBRVs which show strikingly different values among evaluation and management, invasive, and imaging services, the ratios of Ontario fees to RBRVs are more comparable across categories of services. This finding further strengthens our confidence in the validity of RBRVS. Earlier, we found the measurements of intra-service work to be reliable, valid, and reasonable. We now find RBRVS and Ontario fees to be similar in their relative values across categories of services and within categories. It is hard to explain how two very different methods and processes could produce similar relative value scales unless both scales approximate the real resource costs.

12.4 General Conclusions

In this report, we explicate the fundamental concept of a relative value scale based on resource input, and the methods, data and process used to derive each component of the RBRVS. Our investigation led to three major findings. We found that physicians' work can be defined by a systematic and rational approach, and measured by the magnitude estimation method. We

found the ratings of work for different categories of physician services obtained from a national survey to be reproducible. Moreover, there is a high degree of agreement among physicians on ratings of work within their specialties. Favorable findings from formal statistical analysis and TCG physicians' review of results led us to conclude that, in general, the ratings of work are reliable, consistent, and valid.

Second, we found that a common scale can be developed to serve as a basis for inter-specialty relative values. We identified services which required similiar work and were performed by more than one specialty, and then used these services to quantitatively align specialty-specific ratings of work onto a common scale. Analysis of the accuracy of the resulting common scale showed that the typical disagreement between groups of physicians from different specialties about the work of a given service was only seven percent. This disagreement was comparable to that of physicians when rating the work of a service within a specialty. This result suggests that the services we identified are good links between specialties.

Finally, we found it feasible to develop an RBRVS for most services and procedures without having to study each of the 7,000 unique coded services in CPT-4. We designed a method to extrapolate the RBRVs of services studied in depth to those not studied. Our method classified approximately 7,000 services into several hundred homogeneous families based on specialty, category of service, performance setting, anatomic part, and similar

factors. We selected a benchmark service within some families for in-depth study, and derived an RBRV for that service. Charge data were then used to extrapolate the RBRV for the benchmark service to other services within that family.

This approach allowed us to use current charge data while largely eliminating any distortion from these charges. This is the case because, although health insurance and other market forces can cause large distortions in charges between families of services, they tend to produce much less distortion within families. This extrapolation method produces reasonable results for most invasive, imaging, and laboratory services. However, because the CPT-4 coding system assigns ambiguous descriptions to the codes classifying evaluation and management services, our use of families is probably not the best extrapolation method for this category of services. This question will be followed up by further research.

12.5 Discussion

12.5.1 Limitations of RBRVS

The RBRVS has its limitations. First, it is based on the CPT-4 classification system. Any classification system encompasses some variation within its classes; in this case, however, the severity of patients within a given CPT-4 code may differ systematically from one physician to another. For example, a well-known consultant may be sent an unusual number of

complicated referrals, requiring more than the average amount of work for a particular CPT-4 code to treat those patients. This shortcoming is generic to any payment system using a uniform fee schedule.

Second, the RBRVS does not take into account the quality of services. It is currently unfeasible to differentiate the quality of the 500,000 practicing physicians practicing in the United States. Nonetheless, the RBRVS could incorporate a quality index when accurate physician-specific information does become available. Years of experience or certification by specialty board have been suggested as crude proxies for quality. We had neither the time nor the budget to investigate these possibilities and thus omitted a quality adjustment from the RBRVS.

Third, the RBRVS measures only resource inputs; the benefits of services are not considered. We have argued elsewhere that current knowledge and data make it unfeasible to incorporate benefit systematically into any relative value. Nevertheless, a rational payment system should recognize social benefits in the relative value. Perhaps this topic should be a high priority on the future research agenda.

Finally, the RBRVS does not take into account patients' demand for services. In a reasonable competitive market, fees for physicians services would be driven down by competition to the resource costs required to produce these services. Services whose costs exceed patients' willingness to pay would not be

demanded by patients. While RBRVs may reasonably represent the relative costs of different services, RBRVS-based payment rates for some services could exceed patients' valuation of them. This problem has to be considered if the RBRVS is used to pay physician services.

12.5.2 Unresolved Methodologic Issues

Several important methodological questions about the development of the RBRVS remain to be resolved before adopting the RBRVS into payment policy. Considerable time and research effort are necessary to address them adequately.

First, our study relies on the CPT-4 system to classify physicians services. The CPT-4 system is designed for multiple purposes, not just for billing physicians services. Some of its resulting limitations directly affect the RBRVs. For example, the major difficulty in establishing RBRVs for evaluation and management services services stems not from measuring the work of these services but in interpreting the CPT-4 codes. We have seen that because of the ambiguity in the descriptions of services, the codes appear to be understood very differently by different specialties. Further, there may be major variations in how they are interpreted within specialties. Differences in interpretation of these codes seem to follow from the ambiguity with which they are defined, difficulty in applying the definitions successfully for different specialties, and the lack of a uniform standard of assigning codes. These difficulties

have been noted by other observers, including those of the Physician Payment Review Commission. Under these circumstances, we are not confident to attach RBRVs to these codes that would be applicable to different specialties. Limitations of surveyed data and of an adequate data base on charges precludes development of specialty-specific RBRVs.

Nevertheless, our data suggest another approach. Physicians are in close agreement in their ratings of work and time for a large number of evaluation and management services. We have also found that the work per unit of time of these services varies within a relatively narrow range.

Ratings of work for evaluation and management services have a closer relationship to time than do those of other services, particularly invasive services. The work per minute of evaluation and management services is similiar across services. Further the mean work per minute by site and function of evaluation and management service differs minimally. Other than telephone services and post-operative hospital services, which show higher average ratings of work per minute than do office, consultative, and nursing home services, the mean values for all other types are within one standard deviation of the mean (0.6) for office services. Importantly, for each type of service the range of W/T across specialties is modest.

These results suggest that clearer definitions of billing codes for evaluation and management services, with specification of time, would permit the development of RBRVs designed to

provide equitable reimbursement. The Physician Payment Review Commission stated in its second annual report that: "To account for differences in work by specialty for visits and consultations, definitions of existing codes could be improved and their use standardized, or a new set of codes might be developed..." We propose to explore one or more new extrapolation methods for evaluation and management services.

For instance, we will use regression analysis to predict total work using intra-service time (the time most clearly measured) for evaluation and management services. We would perform individual analyses for medical specialties and for surgical specialties. If data on enough services are available, analyses would be performed to distinguish office, hospital, surgicenter, emergency, and nursing home services.

The results of these analyses would be predictive models using total work as a function of time for evaluation and management services services for important classes of services and types of specialties. Application of the appropriate factors for practice costs and the opportunity cost of training would allow the predictions of total work from the models to be translated into RBRVs for each specialty for evaluation and management services. Although time is not a part of the current definitions of CPT-4 codes for evaluation and management services, specification of time would allow assignment of RBRVs to codes that would be a more fair reflection of work than is possible under the current system of usage.

A second unresolved methodological issue involves physicians billing for packages of services. Surgeons often charge a global bill, covering a package of services including initial examination in the office, the surgical operation, post-operative services in the hospital, and office visits after hospital discharge. However, the services covered by a global bill vary greatly among surgeons. The CPT-4 coding system doesn't specify the services to be included in a global bill. Consequently, it is impossible to generate accurate RBRVs for services that are billed globally until the package of services is well-defined.

Third, in the current formulation of RBRVS, specialty-training and office-practice costs are allocated to every service performed in a given specialty according to the work input required to perform that service. This method of allocation may not be appropriate, because costs of specialized training and practice costs do not necessarily vary with the amount of work.

Fourth, we incorporated only inter-specialty differences in practice costs in the RBRVS; inter-service variations in practice costs were not incorporated. For example, the practice costs of office-based and hospital-based services could differ; some services may require greater-than-average amounts of equipment or material costs; and professional liability-insurance premiums, rent, and wages can differ greatly between regions. The monetary conversion factor is probably the most suitable vehicle for taking into account these differences in practice costs.

12.6 Future Research

The RBRVS study is a vast and complex undertaking. This report describes the work and accomplishments of the study, along with the problems we encountered and the methodologic questions and data problems that remain to be resolved. Important research remains to be done, including:

1. Expanding the study to include all of the most frequently performed services under Medicare, Part B. This would involve extending the study to specialties omitted in the current investigation, such as cardiology, gastroenterology, neurosurgery, and the like. Furthermore, researchers will have to re-survey a few specialties for which we were unable to survey an adequate number of services, since these specialties perform hundreds of them. These specialists should be surveyed with a different set of services in order to obtain more comprehensive data on the full range of their services.
2. Developing a more suitable extrapolation method for evaluation and management services. To do so, we have to address the ambiguity in the CPT-4 descriptions of these services. We will also conduct further research to develop more refined

extrapolation methods.

3. Developing a review process and subjecting the RBRVs to wider review by physicians. The RBRVs derived directly from the surveys have been reviewed by our Technical Consultant Groups. However, the RBRVs developed from extrapolation were reviewed only by a small group of physicians. This is just the first step. We recommend more extensive review of RBRVs by different groups of physicians.
4. Completing the development of RBRVs for psychiatry and anesthesiology. The CPT-4 codes for psychiatric services have been criticized as very inadequate. As a result, the RBRVs may not be accurate measurements of the resource costs expended for many CPT-4 codes. For anesthesiology, we need to translate the RBRVs into the present relative-value system used by this specialty, and examine how the RBRVs could be implemented in the context of that existing system.
5. Developing improved methods and data to estimate pre- and post-service work.
6. Conducting further validity and sensitivity analyses to ascertain the stability of RBRVs

as we modify the methods and process, and employ new data to estimate RBRVS.

7. Conducting further validity analysis by examining such questions as whether physicians ratings of work vary by their demographic and socio-economic background.

12.7 Implementation Issues

Many issues must be addressed if an RBRVS is to be applied to payment policy. While an RBRVS can be used for other purposes, such as identifying deviant charges and establishing salaries for physicians in managed-care settings, we will focus here on its use in constructing a fee schedule.

12.7.1 Conversion Factor

Creating a fee schedule from an RBRVS requires the use of a monetary conversion factor (dollars per relative value unit). Determination of a conversion factor is outside the scope of this study. The selection of a conversion factor raises a number of important issues and determines the critical translation of relative values into absolute dollar amounts. One possible option is to calculate a conversion factor that is "budget neutral" for Medicare.

Policymakers will doubtless address a range of considerations in setting a conversion factor, one of which is the likely effect on a total budget. Other possible objectives

that policymakers might consider, for example, are providing incentives for preventive services or for attracting physicians to underserved areas. These might be approached by creating differential conversion factors for such services or for selected geographic areas.

We have pointed out some elements of resource cost that are impractical to include in the RBRVS, suggesting instead that the conversion factor is an appropriate place for these costs to be addressed. One such area is extreme differences in professional liability insurance rates among geographic areas, and the rapid pace of change in these premium rates. Similarly, expensive equipment is required for some services but not others. Differences in cost between office-based and hospital-based practices in the same specialty, among other such cost differences, might also be addressed by the conversion factor.

12.7.2 Practice Costs

Our methodology incorporates practice costs into the RBRVS as a percentage of physicians' gross revenues. This treatment of specialty differences in practice costs is adequate for comparing the RBRVS to current charges; it is not adequate, though, for constructing an RBRVS-based fee schedule for the future. When the gross revenue of a specialty changes significantly under a new payment system, the ratio of costs to revenues will also be changed, and the RBRVS will be affected. This phenomenon raises important conceptual issues about how practice costs ought to be

applied in constructing a fee schedule based on an RBRVS. We discuss alternative ways to address practice costs, and their limitations, in the chapter on practice costs in this report.

The adequacy of practice-cost data also presents problems. For some specialties, such as allergy and immunology, we were unable to find adequate data. For others, like radiology, it was difficult to obtain data on differences between office-based and hospital-based practice. Still other specialties are experiencing marked change in practice costs; in pathology, the bearing of practice costs is said to be shifting rapidly from hospitals to physicians.

12.7.3 Billing Codes and Billing Conventions

Although the CPT-4 generally designates separate codes for "global fees," the services included in such a billing code are not clearly specified. There is also no standard convention as to how the codes should be used. A recent survey by the U.S. government and insurers showed substantial variation in Medicare carriers' policies with regard to the inclusion and extent of preoperative care (consultation and visits), postoperative care (hospital and office visits), perioperative procedures, and care for complications in the surgical package. This issue affects evaluation/management as well as surgical services. For example, some physicians include urinalysis or reading an ECG in their charges for comprehensive office visits, while other physicians charge separately for these tests.

12.7.4 Updating

Medical technologies, and ways of organizing and providing services, change rapidly. If fees are to reflect input costs fairly, and new distortions in the fee structure are to be avoided, an operational system of reimbursement must have the capacity to respond to these changes. Any system of updating should be able to address relevant changes in practice costs, training, and, perhaps most importantly, changes in specific medical services. Updating of the RBRVS might include establishing a panel of medical experts charged with identifying significant medical advances that have affected specific services. New surveys of the work of such services could then be performed. Alternatively, a process could be established for measuring the dimensions of work and then applying an appropriate mathematical function, based on the empirical relations we observed between work and its dimensions.

12.7.5 Labor Substitution

Many diagnostic tests, such as electrocardiograms and allergy skin testing, typically involve input by technicians who substitute their work for that of physicians. Sometimes billing codes and conventions do not distinguish adequately between the physician's component and the combined physician-and-technical component. These ambiguities can result in high reimbursement relative to the physician's work input. In other cases, no

distinction is made between the professional and technical components of services. Both circumstances can create undue incentives to perform such diagnostic tests. Some TCG panelists suggested that these feature of reimbursement for testing may have contributed to the recent rapid increases in the volume of diagnostic tests. The induced costs of such testing may also have contributed to recent increases in reimbursements under Medicare and to health costs in general.

For these reasons, we believe that adequate methods to distinguish the technical and professional inputs in diagnostic services are a high priority in implementation of an RBRVS-based fee schedule.

12.8 Applications of the RBRVS to Reimbursement

Because an RBRVS-based fee schedule would differ significantly from current charges, it would alter the structure of economic incentives for physicians' services. Implementation of such a fee structure has the potential to alter the mix of services physicians provide, their willingness to treat Medicare beneficiaries, and specialty choice on the part of new medical-school graduates. Scant empirical knowledge makes it hard to predict the exact impacts of an RBRVS on access, quality, and the cost of care. Only a few health-care financing programs in the United States have significantly altered the relative fees paid to physicians, and the experience of these programs has not been carefully evaluated. Alterations in incentives under the HMO

staff model and under fee freezes may not be directly relevant to predicting how physicians may respond to a change in relative fees.

The lack of empirical data gives rise to two proposals to policymakers. One is that, due to the potential for serious shifts in physician practices, policymakers should consider phased implementation of an RBRVS-based fee schedule. The second is to consider providing for ongoing evaluation of the changes and effects brought about by an RBRVS.

We believe that evaluation should be integral to implementation of a Medicare fee schedule based on resource inputs. Ideally, demonstration projects should be conducted before putting into effect such a major change in payment systems. In addition to access, quality, and the cost of medical services, evaluation should also look into: (1) how the volume of services with high current charge-to-RBRV ratios is affected as their fees drop, (2) the effects of changed fees on the volume of diagnostic testing, (3) how the new fee structure affects per-capita volume of services in the various categories of services, and (4) how the change in reimbursement policy eventually affects physicians' choices of specialty and location.

An alternative to demonstration studies is to evaluate "natural experiments." Canada's provinces have adopted relative fees whose values resemble those of the RBRVS; Massachusetts Medicaid has adopted a fee schedule based on resource-input costs; and several preferred-provider organizations have altered

the relative fees they pay to physicians. Evaluation of these programs could provide information useful in setting policy and designing an appropriate payment system.

12.9 Concluding Remarks

The RBRVS offers a new approach to establishing a fee structure for physicians' services. We have pointed out its limitations. The RBRVs measures only resource inputs; the benefits of services are not considered. Nor does the RBRVS recognize differences in the quality of services provided by different physicians. Moreover, we have not built into the relative value for a given code any systematic differences in the severity of patients treated by different physicians.

We have described the unresolved methodological issues and recommended what follow-up research studies should be conducted. We have also pointed out the important questions that must be addressed if the RBRVS is adopted into policy.

The current physician payment system is widely criticized for retaining historically distorted fees. Distorted fees in turn present perverse incentives to physicians. We believe that the RBRVS offers a systematic and rational approach to establishing relative values based on physicians' work input. A relative value based on resource costs would approximate relative fees in a perfect competitive market. Hence the RBRVS could provide a fair and equitable approach to compensating physicians for the services they deliver. At a minimum, an RBRVS-based

payment system would remove the distortions in current fees and provide a neutral incentive structure for physicians in making medical decisions. We believe the RBRVS could also enhance cost-effective medical care and ameliorate the manpower shortage in some primary-care specialties. (DHHS, 1980; 1982), (Congress, 1980).

Table 90

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
00142	an M anesthesia for lens surgery	54	77	147	278	257
00210	an T anesth, open head surgery	113	250	435	798	737
00350	an P anesth, major neck vessel surgery	86	150	340	576	532
00404	an S anesth, surgery of breast	67	114	176	358	331
00562	an A anesth, heart vessel repair with pump oxygena	118	271	615	1004	928
00770	an K anesth, major abdominal blood vessel repair	125	323	509	957	884
00790	an F anesth, surgery of upper abdomen	61	95	201	358	330
00806	an E anesth, laparoscopic procedures	43	51	127	221	204
00830	an Std anesth, repair of hernia lower abdomen	51	74	96	220	203
00840	an C anesth, surgery of lower abdomen	91	150	256	497	459
00850	an U anesth, cesarean section	68	100	231	399	369
00910	an B anesth, transurethral procedures	27	28	73	128	118
00914	an O anesth, transurethral removal of prostate	57	83	173	312	289
00940	an L anesth, vaginal procedures	25	25	65	116	107
01210	an J anesth, hip joint surgery	81	134	232	447	413
01214	an G anesth, replacement of hip	100	197	292	589	544
01270	an D anesth, upper leg arteries surgery	103	207	299	609	563
01382	an I anesth, knee arthroscopy	55	79	105	239	220
01710	an Q anesth, upper arm surgery	49	65	101	215	199
01710	gs C anesth, upper arm surgery	38	50	79	167	215
11100	dm L biopsy of skin, one lesion	17	18	58	93	89
11401	dm A removal benign skin lsn, trunk, 0.6 To 1.0 Cm	30	33	101	164	157
11441	dm U removal benign skin lsn, face, 0.6 To 1.0 Cm	32	36	105	173	110
11441	mx J removal benign skin lsn, face, 0.6 To 1.0 Cm	22	21	73	115	117
11641	dm N removal malignant skin lsn, face, 0.6 To 1.0	38	41	155	234	223
11642	dm M removal malignant skin lsn, face, 1.1 To 2.0	29	30	108	167	159
11900[2]	dm F injection into skin lesions, less than 8 les	10	11	24	45	43
12002[2]	fp C[3] repair superficial wound(s), 2.6 To 7.5 Cm	22	25	75	121	122
12002[2]	pe P[3] repair superficial wound(s), 2.6 To 7.5 Cm	22	25	75	121	117
15822-50	op I revision of upper eyelid	128	294	443	865	872
17000[2]	dm B destruction of face lesion, one lesion	14	15	41	70	67
17100[2]	dm O destruction of skin lesion, one lesion	14	15	40	69	66

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description		Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
17999	dm I	skin tissue procedure, unlisted	25	29	65	119	114
19240	gs D	mastectomy, mod radical incl axillary lymph n	168	442	768	1379	1379
20550[2]	rh G	injection, tendon sheath	15	16	39	70	83
20610[2]	im C[3]	inject/drain joint/bursa	20	21	52	93	91
20610[2]	or R[3]	inject/drain joint/bursa	20	21	52	93	114
20610[2]	rh E[3]	inject/drain joint/bursa	20	21	52	93	109
21200	mx I	osteotomy, mandible, total or horizontal	338	631	1176	2145	2179
21240	mx W	arthroplasty, tmj, with or without autograft	247	134	1056	1437	1459
21250	mx A	osteoplasty of maxilla, lefort type operation	367	827	1974	3169	3219
21320	ot R	treatment of nose fracture with stabilization	77	85	155	317	337
21365	mx T	open repair cheek bone fracture	208	635	908	1752	1780
21455	mx P	closed repair lower jaw fracture	146	267	467	880	894
21470	mx Q	open repair lower jaw fracture	210	639	955	1804	1832
24640[2]	or M	treat radial head dislocation, child	15	20	73	108	79
24640[2]	pe M	treat radial head dislocation, child	13	14	37	64	62
25611	or G	repair fracture radius/ulna, percut pins and	124	70	501	695	854
27130	or A	total hip joint replacement	175	701	1486	2363	2903
27244	or F	open repair of femur fracture	158	671	881	1710	2101
28292	or C	correction of bunion, keller mcbride mayo pro	98	57	365	519	638
29881	or D	knee arthroscopy/surgery, meniscectomy	112	68	557	737	905
29909	mx U	arthroscopy of joint, unlisted procedure	198	105	615	918	932
30420	ot F	rhinoplasty, primary, with major septal repai	150	393	764	1307	1387
31032	mx O[3]	explore sinus,remove polyps, unilateral	125	237	350	713	724
31032	ot T[3]	explore sinus,remove polyps, unilateral	125	237	350	713	756
31365	ot A	removal of larynx, radical neck dissection	227	856	1643	2726	2894
31500	pe K	intubation, endotracheal, emergency procedure	14	99	92	205	199
31535	ot G	operative laryngoscopy, direct, with biopsy	86	149	212	448	475
31603	gs E[3]	tracheostomy, emergency, transtracheal	23	77	288	388	388
31603	ot M	tracheostomy, emergency, transtracheal	23	77	397	497	412
31603	ts R[3]	tracheostomy, emergency, transtracheal	23	77	288	388	374
31621	ot E[3]	bronchoscopy, diagnostic, flexible or rigid	104	121	199	424	450
31621	ts G[3]	bronchoscopy, diagnostic, flexible or rigid	104	121	199	424	409

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description		Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
32000[2]	ts L	drainage of chest	85	133	106	324	312
32020	gs B[3]	tube of thoracostomy with water seal	63	187	108	359	359
32020	ts B[3]	tube of thoracostomy with water seal	63	187	108	359	346
32480	ts H	lobectomy, total or segmental	196	906	1125	2227	2148
33010[2]	ts M	pericardiocentesis, initial	65	220	169	453	437
33207	ts Std	insertion of heart pacemaker, ventricular	117	242	284	643	620
33405	ts T	replacement of aortic valve, with cardiopulm	212	1024	1711	2947	2841
33512	ts A	coronary arteries bypass, three coronary graf	219	1219	2444	3883	2871
33512	ts D	coronary arteries bypass, three coronary graf	208	1056	1713	2978	2871
33681	ts P	repair heart septum defect, direct	226	777	1566	2569	2477
33970	ts Q	intra-aortic balloon, insertion only	136	331	550	1017	981
35081	ts I	repair defect of abdominal aorta	211	998	1452	2662	2566
35301	ts O	rechanneling of carotid artery	172	441	906	1519	1465
39400	ts J	mediastinoscopy, with or without biopsy	120	204	344	667	643
42145	ot O	repair,palate,pharynx/uvula	126	280	416	821	872
42415	ot L	excise lat lobe parotid gland/lsn, preserv fa	153	400	1102	1655	1757
42820	gs F[3]	remove tonsils and adenoids, under age 12	80	118	171	369	369
42820	ot Std[3]	remove tonsils and adenoids, under age 12	80	118	171	369	392
43110	gs A[3]	esophagectomy, gastric anastomosis with vagot	221	1227	1776	3224	3224
43110	ts S[3]	esophagectomy, gastric anastomosis with vagot	221	1227	1776	3224	3109
44145	gs G	partial removal of colon, with coloproctostom	191	577	1174	1942	1942
44950	fp D	appendectomy	87	177	234	498	623
44950	gs H	appendectomy	121	173	326	621	621
45300	fp E[3]	proctosigmoidoscopy, diagnostic	21	23	74	117	118
45300	gs I	proctosigmoidoscopy, diagnostic	22	25	61	108	117
45300	im D[3]	proctosigmoidoscopy, diagnostic	21	23	74	117	115
45385	gs J	colonoscopy, lesion removal	115	64	339	518	518
46050[2]	fp F	incision of perianal abscess	27	31	77	135	135
47600	gs K	cholecystectomy	126	258	607	991	991
49505	gs Std	repair inguinal hernia, age 5 or over	81	132	263	476	476
49505	ur T	repair inguinal hernia, age 5 or over	131	286	470	886	491
50080	ur L	percutaneous removal kidney stone, up to 2 cm	187	510	1167	1864	1924

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
50590	ur M lithotripsy, extracorporeal shock wave	188	162	910	1261	1302
51595	ur A remove bladder, revise tract	258	1037	2426	3722	3842
51726	ur P complex cystometrogram	34	38	115	187	193
52000	ur Std cystoscopy	88	119	92	300	232
52000	ur I cystoscopy	27	28	95	150	232
52234	ur K cystoscopy and treatment of tumor, 0.5 To 2.0	129	258	435	822	849
52235	ur C cystoscopy and treatment of tumor, 2.0 To 5.0	136	280	519	936	966
52332	ur Q cystoscopy, insertion of indwelling ureteral	87	160	226	473	488
52336	ur N cystoscopy, stone removal	156	379	835	1370	1414
52601	ur H prostatectomy (tur)	155	314	919	1388	1433
54400	ur E insertion penile prosthesis, non-inflatable	147	345	692	1184	1222
55250	ur U removal of sperm duct(s)	124	81	253	458	472
57454[2]	ob N vagina examination & biopsy	34	37	120	190	195
58120	ob Std dilation and curettage	83	116	101	299	307
58150	fp G total hysterectomy	120	284	366	769	987
58150	gs L total hysterectomy	151	294	669	1114	983
58150	ob J total hysterectomy	124	330	504	958	1007
58265	ob V vaginal hysterectomy & vagina repair	135	340	545	1020	1045
58925	ob I removal of ovarian cyst(s)	115	242	307	664	680
58982	ob O laparoscopy, tubal cautery	102	84	224	409	419
59000[2]	ob S amniocentesis	101	95	124	320	328
59025-26	ob T fetal non-stress test	0	0	41	41	42
59410	fp H vaginal delivery only, incl in-hosp postpartu	14	140	251	405	372
59410	ob M vaginal delivery only, incl in-hosp postpartu	11	114	241	366	379
59500	ob Q cesarean section, incl in-hosp postpartum car	121	258	367	747	765
59840	ob W abortion	91	98	152	341	350
61526	ot Q removal of brain lsn, cerebellopontine angle	240	951	1965	3156	3350
62270[2]	pe N spinal fluid tap, diagnostic	25	27	78	130	126
62278[2]	an R inject spinal anesth, epidural or caudal, si	38	41	126	205	190
63017	or T removal of spinal lamina, lumbar	189	592	1435	2216	2723
63030	or E low back disk surgery, unilateral	169	465	1074	1709	2100

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
64721	gs M[3] revise median nerve at wrist	98	56	193	347	347
64721	or Std[3] revise median nerve at wrist	98	56	193	347	427
65740	op A corneal transplant, fresh	210	651	1220	2082	2098
65850	op L incision of eye	172	173	680	1024	1032
66984	op J remove cataract, insert lens	195	539	846	1580	1592
66985	op E insert lens prosthesis after cataract removal	165	344	597	1107	1116
66999	op T unlisted procedure, anterior segment of eye	136	270	512	918	925
67107	op M repair detached retina, scleral buckling	199	602	1028	1828	1842
67228	op N treatment of retinal lesion, photocoagulation	78	79	532	689	694
67312	op K strabismus surgery, two muscles, one or both	136	298	532	966	973
67800	op Std excision of chalazion, single	50	30	48	127	128
67840[2]	gs N remove eyelid lesion	89	69	141	299	536
67840[2]	op U remove eyelid lesion	133	87	317	536	541
69200	ot U clear outer ear canal, without general anesth	18	19	64	100	107
69200	pe U clear outer ear canal, without general anesth	16	18	45	79	97
69437	ot D tympanostomy, general anesthesia, bilateral	82	100	104	287	305
69641	ot H revise mid ear & mastoid, w/o ossicular chain	198	679	1070	1947	2066
69930	ot P implant cochlear device	205	690	1176	2071	2199
70260-26	ra O x-ray exam of skull, minimum four views	3	6	24	32	29
70330	mx S x-ray exam of jaw joints	0	0	74	74	75
70355-26	mx R panoramic x-ray of jaws	0	0	26	26	27
71020-26	ra B x-ray exam of chest, two views	2	4	18	24	22
71111-26	ra C x-ray exam of ribs, chest, minimum four views	3	6	24	33	30
72110-26	or L x-ray exam of lower spine, compl, with obliqu	0	0	36	36	44
72110-26	ra Q x-ray exam of lower spine, compl, with obliqu	4	6	27	36	33
72140	ra K magnetic resonance imaging, spinal cord and s	23	47	159	228	205
72266	or S[3] myelography, lower spine, complete procedure	32	65	177	275	338
72266	ra S[3] myelography, lower spine, complete procedure	32	65	177	275	247
73080-26	or P x-ray exam of elbow, complete, minimum three	0	0	29	29	35
73110-26	or O x-ray exam of wrist, complete, minimum three	0	0	42	42	52
73120-26	rh B x-ray exam of hand, two views	0	0	21	21	24

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]	/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
73510-26or	U	x-ray exam of hip, complete, minimum two view	0	0	34	34	35
73510-26ra	T[3]	x-ray exam of hip, complete, minimum two view	3	5	21	28	25
73510-26rh	Q[3]	x-ray exam of hip, complete, minimum two view	0	0	21	21	33
73610-26ra	I	x-ray exam of ankle, complete, minimum three	2	4	14	20	18
73630-26ra	Q	x-ray exam of foot, complete, minimum three v	0	0	30	30	37
74020-26ra	L	x-ray abdomen, compl, incl decubitus and/or e	3	6	26	35	31
74160-26ra	F	contrast cat scan of abdomen	13	14	107	133	120
74247 ra	Std	contrast xray upper gi tract, with kub	13	16	59	89	80
74280 ra	D	contrast x-ray exam of colon	15	29	90	134	121
74400 ra	M	contrast x-ray urinary tract	10	19	68	97	87
74741 ra	R	x-ray female genital tract, complete	15	29	91	135	121
75657 ra	A	artery x-rays, head & neck, 3 or 4 vessels, c	73	155	463	691	621
75821 ra	N	vein x-ray, arm/leg, unilateral, complete	24	24	107	155	140
76091-26ra	J	x-ray exam of breasts	5	11	50	66	59
76361 ra	H	cat scan for needle biopsy, complete	30	61	208	299	269
76512 op	H	echo exam of eye, b-scan	0	0	97	97	97
76516 op	G	echo biometry of eye, a-mode	0	0	70	70	70
76700 ra	E	echo exam of abdomen, b-scan, complete	15	31	100	147	132
76805 ob	R	echo exam of pregnant uterus, b-scan, complet	0	0	152	152	170
76805 ra	G	echo exam of pregnant uterus, b-scan, complet	16	33	117	166	149
77400 dm	Q	daily radiation therapy, simple	17	18	53	88	84
77763 ob	Y	radioelement application, complex	83	150	186	419	429
78351-26ra	P[3]	bone mineral content study, dual photon	4	7	30	41	37
78351-26rh	L[3]	bone mineral content study, dual photon	0	0	30	30	49
80500 ai	Q[3]	lab path consult, limited, w/o hist/med recor	0	0	28	28	39
80500 pa	F[3]	lab path consult, limited, w/o hist/med recor	0	0	28	40	30
80500 pa	P	lab path consult, limited, w/o hist/med recor	0	0	26	38	30
80500 pa	R	lab path consult, limited, w/o hist/med recor	0	0	26	39	30
80502 pa	K	lab path consult, compreh, history/med record	0	0	88	119	91
81000 fp	I	urinalysis with microscopy	0	0	15	15	16
81000 im	E	urinalysis with microscopy	0	0	15	15	16
81000 pe	Q	urinalysis with microscopy	0	0	18	18	15

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]		Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
85060	pa	H	blood smear interpretation	0	0	31	44	34
85595-26rh		R	electronic platelet count	0	0	10	10	11
85651-26rh		P	rbc sedimentation rate, westergren type	0	0	12	12	14
86078	pa	N	physician blood bank service, invest transf r	0	0	74	98	75
86455	ai	M	skin test, anergy testing, one or more antige	18	29	63	111	113
87207	dm	D	smear, stain & interpret, inclusion bodies/pa	0	0	33	33	31
87220	dm	H[3]	tissue exam for fungi	0	0	23	23	22
87220	fp	J[3]	tissue exam for fungi	0	0	23	23	23
88104	pa	G	cytopathology, smears with interpretation	0	0	59	76	58
88173	pa	J	fine needle aspirate, interpretation and repo	0	0	95	127	97
88302	pa	B	surgical pathology, complete, normal tissue	0	0	9	12	9
88304	pa	Std	surgical pathology, complete, abnormal tissue	0	0	18	25	19
88305	dm	S	surg path, single compl/multip uncomp, compl	0	0	66	66	100
88305	pa	I	surg path, single compl/multip uncomp, compl	0	0	94	128	80
88305	pa	L	surg path, single compl/multip uncomp, compl	0	0	66	90	80
88305	pa	O	surg path, single compl/multip uncomp, compl	0	0	90	126	81
88305	pa	Q	surg path, single compl/multip uncomp, compl	0	0	51	75	81
88307	pa	M	surg path, single or multiple compl, compl di	0	0	94	128	98
88309	pa	A	surg path, complete, complex diagnostic probl	0	0	195	265	203
88312	pa	E	special stains, each	0	0	53	65	50
88331	pa	C	consult during surg, frozen section(s), singl	0	0	97	149	114
89051	rh	F	body fluid cell count with differential	0	0	42	42	49
89320	ur	R	semen analysis, complete	0	0	44	44	45
90015	mx	B	office visit, new, intermediate	10	14	26	50	67
90015	mx	L	office visit, new, intermediate	9	23	50	82	67
90017	dm	C	office visit, new, extended	12	22	66	100	86
90017	dm	E	office visit, new, extended	10	20	59	89	86
90017	dm	J	office visit, new, extended	6	14	62	82	86
90017	im	F	office visit, new, extended	5	33	99	137	123
90017	im	S[3]	office visit, new, extended	9	26	80	116	123
90017	ob	A	office visit, new, extended	13	27	112	152	147

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
90017	ob U office visit, new, extended	16	31	89	136	147
90017	or N office visit, new, extended	7	23	69	99	122
90017	ot C office visit, new, extended	14	27	72	113	121
90017	ot N office visit, new, extended	13	26	77	116	121
90017	ur G office visit, new, extended	16	30	89	135	143
90017	ur J office visit, new, extended	18	36	112	166	143
90017	ur O[3] office visit, new, extended	9	26	80	116	143
90020	ai F office visit, new, comprehensive	22	65	152	238	249
90020	ai L office visit, new, comprehensive	24	69	162	256	249
90020	ai N office visit, new, comprehensive	22	59	158	239	249
90020	dm R office visit, new, comprehensive	13	26	75	114	113
90020	dm T office visit, new, comprehensive	12	23	87	121	113
90020	fp K[3] office visit, new, comprehensive	21	42	122	185	186
90020	gs O office visit, new, comprehensive	54	96	124	274	218
90020	gs P[3] office visit, new, comprehensive	19	44	99	162	218
90020	mx K office visit, new, comprehensive	32	70	134	235	239
90020	ob C[3] office visit, new, comprehensive	21	42	122	185	214
90020	ob X office visit, new, comprehensive	29	58	146	233	214
90020	or H office visit, new, comprehensive	11	32	103	146	189
90020	or I[3] office visit, new, comprehensive	19	44	99	162	189
90020	ot I office visit, new, comprehensive	16	32	97	145	154
90020	ot S office visit, new, comprehensive	17	33	93	144	154
90020	pe H office visit, new, comprehensive	16	32	91	139	138
90020	pe L office visit, new, comprehensive	19	38	113	170	138
90020	pe S office visit, new, comprehensive	14	27	76	117	138
90020	rh A office visit, new, comprehensive	49	100	263	413	355
90020	rh C office visit, new, comprehensive	35	69	163	267	355
90020	rh H office visit, new, comprehensive	22	41	149	212	355
90020	rh K office visit, new, comprehensive	41	72	250	363	355
90020	rh O office visit, new, comprehensive	34	67	153	255	355
90020	ts K office visit, new, comprehensive	45	61	131	237	213
90020	ts N office visit, new, comprehensive	34	50	113	197	213

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
90020	ts U office visit, new, comprehensive	49	52	127	228	213
90020	ur S office visit, new, comprehensive	34	56	141	231	239
90040	pe B office visit, established, brief	3	5	16	24	23
90050	ai Std office visit, established, limited	8	12	40	60	62
90050	dm Std office visit, established, limited	5	9	29	42	38
90050	dm G[3] office visit, established, limited	4	6	27	38	38
90050	fp Std[3] office visit, established, limited	6	13	44	62	49
90050	fp B[3] office visit, established, limited	4	6	27	38	49
90050	fp L office visit, established, limited	4	8	39	51	49
90050	fp M[3] office visit, established, limited	3	7	32	43	49
90050	gs Q office visit, established, limited	7	10	37	54	54
90050	im Std[3] office visit, established, limited	6	13	44	62	50
90050	im B[3] office visit, established, limited	3	9	37	49	50
90050	im H[3] office visit, established, limited	3	7	32	43	50
90050	ob B office visit, established, limited	8	10	38	56	65
90050	ob P office visit, established, limited	7	14	50	71	65
90050	op S office visit, established, limited	5	9	31	45	46
90050	ot B[3] office visit, established, limited	3	9	37	49	52
90050	pe Std office visit, established, limited	5	9	29	42	41
90050	pe R[3] office visit, established, limited	3	7	32	43	41
90050	rh Std office visit, established, limited	7	14	47	68	80
90050	rh N office visit, established, limited	6	14	49	69	80
90060	ai B office visit, established, intermediate	6	13	47	66	68
90060	fp N[3] office visit, established, intermediate	11	21	59	91	85
90060	fp O[3] office visit, established, intermediate	8	15	57	80	85
90060	gs R office visit, established, intermediate	7	13	44	64	64
90060	im I[3] office visit, established, intermediate	8	15	57	80	78
90060	ob D office visit, established, intermediate	11	23	73	107	101
90060	ob K[3] office visit, established, intermediate	11	21	59	91	101
90060	or K office visit, established, intermediate	9	24	54	87	107
90060	pe I office visit, established, intermediate	12	23	70	105	102
90060	rh I office visit, established, intermediate	12	24	72	107	126

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]	/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
90070	ai O	office visit, established, extended	15	23	86	123	126
90070	fp P[3]	office visit, established, extended	10	36	92	138	135
90070	fp Q[3]	office visit, established, extended	11	32	88	131	135
90070	gs S[3]	office visit, established, extended	10	36	92	138	138
90070	im J[3]	office visit, established, extended	10	36	92	138	131
90070	im L[3]	office visit, established, extended	11	32	88	131	131
90070	ob L[3]	office visit, established, extended	10	36	92	138	153
90070	ob Z	office visit, established, extended	17	35	109	161	153
90070	pe O	office visit, established, extended	16	31	86	133	129
90070	rh J	office visit, established, extended	16	33	99	148	174
90070	ur D	office visit, established, extended	14	27	80	121	125
90080	im K	office visit, established, comprehensive	26	52	126	204	199
90220	ai E	hospital care, new, comprehensive	38	82	199	318	329
90220	ai R	hospital care, new, comprehensive	33	88	205	327	329
90220	fp A	hospital care, new, comprehensive	34	62	151	247	248
90220	gs T	hospital care, new, comprehensive	22	54	107	183	183
90220	im M	hospital care, new, comprehensive	17	60	154	231	226
90220	pe G	hospital care, new, comprehensive	19	47	126	191	185
90240	ts C	subsequent hospital visit, brief	16	17	36	68	66
90250	gs U	subsequent hospital visit, limited	8	9	35	52	52
90250	or B	subsequent hospital visit, limited	10	13	48	71	88
90250	py F	subsequent hospital visit, limited	15	22	58	94	64
90250	ts E	subsequent hospital visit, limited	20	22	77	120	116
90250	ur B	subsequent hospital visit, limited	10	9	35	54	56
90260	im N	subsequent hospital visit, intermediate	15	20	60	95	97
90260	im O	subsequent hospital visit, intermediate	14	19	70	104	97
90350	fp R[3]	care facility subsequent visit, limited	10	14	50	74	74
90350	im P[3]	care facility subsequent visit, limited	10	14	50	74	72
90370	fp S	care facility subsequent visit, extended	21	37	100	159	159
90370	im Q	care facility subsequent visit, extended	27	48	118	192	188
90520	py A	emergency care, new, comprhensive	53	111	300	465	263
90520	py L	emergency care, new, comprhensive	39	81	197	317	263

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]		Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
90570	fp	T	emergency care, established, extended	35	73	174	282	283
90570	im	A	emergency care, established, extended	35	107	230	372	363
90610	im	R	extended consultation	44	66	146	256	250
90610	ur	F	extended consultation	18	36	106	159	165
90620	an	V	comprehensive consultation	22	42	111	175	162
90620	dm	P	comprehensive consultation	20	36	98	154	147
90620	fp	U	comprehensive consultation	27	53	132	212	213
90620	py	D	comprehensive consultation	33	76	172	282	204
90620	py	N	comprehensive consultation	66	88	181	335	204
90620	py	W	comprehensive consultation	34	78	178	290	204
90620	ts	F	comprehensive consultation	50	46	122	218	210
90630	an	N	complex consultation	35	73	167	274	253
90630	fp	V[3]	complex consultation	43	80	159	282	283
90630	gs	V	complex consultation	43	118	279	440	361
90630	gs	W[3]	complex consultation	43	80	159	282	361
90630	im	G	complex consultation	28	80	187	295	288
90630	op	D	complex consultation	24	44	108	176	177
90630	or	J	complex consultation	95	64	290	448	550
90630	py	Q	complex consultation	83	165	378	626	371
90630	py	V	complex consultation	65	127	283	475	371
90630	rh	D	complex consultation	42	83	211	336	395
90642	rh	M	intermediate followup consult	13	26	76	115	135
90750	im	T	preventive medicine, new, adult	16	29	72	117	114
90751	pe	F	preventive medicine, new, 12-17	15	28	78	121	117
90752	pe	E	preventive medicine, new, 5-11	15	19	68	101	98
90763	pe	D	preventive medicine, established, 1-4	10	20	54	85	82
90764	fp	W[3]	preventive medicine, established, infant	5	9	50	64	64
90764	pe	C[3]	preventive medicine, established, infant	5	9	50	64	62
90801	py	M	psychiatric diagnostic interview	64	90	183	337	174
90801	py	S	psychiatric diagnostic interview	14	23	144	181	174
90825	py	E	psychiatric evaluation of tests/records	30	58	135	223	150
90831	py	B	psychiatric telephone consultation	0	18	56	75	50

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Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
90844	py Std individual psychotherapy, 45 to 50 minutes	12	19	103	133	94
90844	py C individual psychotherapy, 45 to 50 minutes	12	19	102	133	94
90844	py G individual psychotherapy, 45 to 50 minutes	12	19	114	145	94
90844	py H individual psychotherapy, 45 to 50 minutes	12	19	100	130	94
90844	py U individual psychotherapy, 45 to 50 minutes	12	19	125	156	94
90847	py I special family psychotherapy	14	23	149	186	171
90847	py T special family psychotherapy	42	84	197	322	171
90849	py J special multiple-family group psychotherapy	33	87	191	312	210
90853	py K special group psychotherapy	12	19	160	190	128
90862	py O psychiatric chemotherapy management	12	19	73	103	69
90870	py P electroconvulsive therapy, single siezure	14	18	108	141	95
90889	py X preparation of patient psychiatric status rep	32	62	135	229	154
90899	py R unlisted psychiatric service/therapy	14	23	152	190	128
92004	op C new eye exam & treatment, comprehensive	13	25	61	99	100
92004	op O new eye exam & treatment, comprehensive	25	46	116	186	100
92012	op B eye exam & treatment, established, intermedia	6	11	36	53	53
92082-26	op F visual field examination(s), intermediate	0	0	41	41	42
92235	op Q ophthalmoscopy/fluorescein angiography	34	39	101	174	175
92250-26	op P ophthalmoscopy, fundus photography	0	0	37	37	37
92286	op R internal eye photography, cell count	0	0	54	54	55
92511	ai I nasopharyngoscopy	39	40	100	178	182
92541-26	ot K spontaneous nystagmus test	0	0	47	47	50
92557-26	ot J comprehensive audiometry	0	0	31	31	33
93000	im U electrocardiogram, complete, minimum 12 leads	0	0	28	28	28
93503	an H[3] right heart catheterization, flow directed ca	41	65	139	244	226
93503	gs X[3] right heart catheterization, flow directed ca	41	65	139	244	244
94010-26	ai H breathing capacity test	0	0	37	37	38
95000	ai C allergy skin tests, 1-30	21	37	77	135	138
95017	ai A sensitivity skin tests, 11-15	48	59	151	259	264
95020	ai D allergy skin tests, 1-10	19	26	76	121	124
95070	ai J bronchial allergy tests	45	44	156	244	249

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]/Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
95135	ai G supervision/provision antigens for immunother	12	10	19	41	42
95150	ai K antigen therapy services	12	23	72	108	110
96912	dm K photochemotherapy with uv-a	14	16	32	62	59
99013	pe T phone consult, simple or brief	0	4	17	21	20
99014	im V phone consult, intermediate	0	6	28	34	34
99014	pe J phone consult, intermediate	0	8	31	39	38
99015	fp X phone consult, lengthy or complex	0	10	49	59	59
99015	im W phone consult, lengthy or complex	0	14	66	80	78
99152	pe A newborn resuscitation	14	104	167	285	276
99155	fp Y[3] conference with physician, approx 25 minutes	6	12	43	61	61
99155	im X[3] conference with physician, approx 25 minutes	6	12	43	61	59
99156	ai P conference with physician, approx 50 minutes	19	22	104	145	148
99160	gs Y critical care, each hour	40	128	340	509	509
?????	ob E Norm uncomp labr, multip, etc, time w pt	15	3	232	250	256
?????	ob F Labor, mod hypertnsn, etc, time w pt	26	34	363	423	433
?????	ob G Pretrm labr etc req tocolysis, time w pt	114	288	324	727	745
?????	ob H Prot labor, pitocin etc, time w pt	32	34	439	506	518
D0597	mx V Placement 4 max endosseous implants	201	100	639	940	954
D7110	mx G Extr 10 erupted mand tth, 60yo on Pers	80	167	213	460	83
D7110	mx H Extr absc tth in a healthy 40yo	16	14	51	81	83
D7240	mx C Rmvl 4 imp (full bony) w/t, off proc	34	26	287	348	353

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 90 continued

Mean survey estimates of cross-specialty work and adjusted work values for all services under study

CPT-4 Number	Specialty[1]	Service description	Cross-specialty work: Pre-service	Post-service	Intra-service	Total-service	RBRV
D7240	mx D	Rmvl 4 imp (full bony) w/t, hosp proc	119	183	342	644	654
D7281	mx Std	Exp 1 imp cuspid off 14yo, fut ortho tx	33	26	89	148	150
D9220	mx E	Gen anes 14yo exp 1X imp cusp, office	33	51	125	209	190
D9220	mx F	Gen anes extr absod tth healthy 40yo	30	23	93	146	190
D9220	mx M	Gen anes in off extr 4 w/t hlthy 18yo	33	28	147	209	190
D9220	mx N	Gen anes extr fxd tooth in 4yo child	22	35	130	187	190

[1]Specialty designator definitions: ai allergy/immunology, an anesthesiology, dm dermatology, fp family practice, gs general surgery, im internal medicine, mx oral/maxillofacial surgery, ob obstetrics/gynecology, op ophthalmology, or orthopedic surgery, ot otolaryngology, py psychiatry, ra radiology, rh rheumatology, ts thoracic/cardiovascular surgery, ur urology.

[2]CPT-4 code specifies only the operative procedure itself; pre- and post-operative services not normally included when reporting a service using this code.

[3]Services are one of a group of "same" cross-specialty links designated as such by Technical Consulting Group members from the respective specialty. This service and other services in its "same" group are presented in Appendix O Table O.3.

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 91

Results of RBRVS (intra-, pre-, and post-service work, resource-based relative values (RBRV)) for four specialties; Comparison of 1986 Medicare mean submitted charges to resource-based relative values

Specialty/CPT-4 number/Service description		Intra-service work	Pre- and post-service work	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV
Family practice						
90370	Skilled nursing facility, subsequent care, extended service	100	58	159	$ 37	0.23
90070	Office visit, extended service, established patient	90	44	135	33	0.24
90060	Office visit, intermediate service, established patient	58	27	86	24	0.28
90020	Office visit, comprehensive service, new patient	122	63	186	53	0.28
90220	Initial hospital visit, comprehensive service	151	96	248	79	0.32
90764	Office visit for healthy infant, established patient	50	14	64	24	0.38
87220	Tissue examination of fungi	23	0	23	9	0.39
90620	Initial consultation, comprehensive service	132	80	213	88	0.41
90050	Office visit, limited service, established patient	36	13	49	21	0.43
45300	Proctosigmoidoscopy; diagnostic	74	44	118	53	0.45
99155	Medical conference by physician regarding medical management	43	18	61	41	0.67
[1]12002	Simple repair of superficial wound, 2.5 cm. to 7.5 cm.	75	*	75	66	0.88
[1]46050	Incision and drainage of perianal abscess	77	*	77	68	0.88
59410	Vaginal delivery only	251	154	407	481	1.18

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 91 continued

Results of RBRVS (intra-, pre-, and post-service work, resource-based relative values (RBRV)) for four specialties; Comparison of 1986 Medicare mean submitted charges to resource-based relative values

Specialty/CPT-4 number/Service description	Intra-service work	Pre- and post-service work	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV
Internal medicine					
90750 Initial office visit, healthy individual; adult	72	45	114	20	0.18
99015 Phone consultation, lengthy or complex	66	14	78	23	0.29
90070 Office visit, extended service, established patient	90	44	131	40	0.31
90080 Office visit, comprehensive service, established patient	126	78	199	68	0.34
90060 Office visit, intermediate service, established patient	57	23	78	30	0.38
90260 Subsequent hospital care, intermediate service	65	34	97	38	0.39
90220 Initial hospital services, comprehensive service	154	77	226	98	0.43
45300 Proctosigmoidoscopy; diagnostic	74	44	115	49	0.43
90350 Skilled nursing facility, subsequent care, limited service	50	25	72	31	0.43
90630 Initial consultation, complex	187	108	288	126	0.44
90017 Office visit, extended service, new patient	90	36	123	55	0.45
90050 Office visit, limited service, established patient	38	14	50	26	0.52
81000 Urinalysis, routine, with microscopy	15	0	15	8	0.53
[1]20610 Arthrocentesis, aspiration and/ or injection, major joint	52	*	51	39	0.76

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 91 continued

Results of RBRVS (intra-, pre-, and post-service work, resource-based relative values (RBRV)) for four specialties; Comparison of 1986 Medicare mean submitted charges to resource-based relative values

Specialty/CPT-4 number/Service description	Intra-service work	Pre- and post-service work	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV
General surgery					
90020 Office visit, comprehensive service, new patient	112	107	218	$ 48	0.22
90070 Office visit, extended service, established patient	92	46	138	34	0.25
90060 Office visit, intermediate service, established patient	44	20	64	27	0.42
90050 Office visit, limited service, established patient	37	17	54	23	0.43
90220 Initial hospital care, brief service	107	76	183	85	0.46
90250 Subsequent hospital care, limited service	35	17	52	29	0.56
19240 Mastectomy, modified radical	768	610	1379	1337	0.97
44145 Colectomy, partial, with coloproctostomy	1174	768	1942	1927	0.99
44950 Appendectomy	326	294	621	703	1.13
47600 Cholecystectomy	607	384	991	1151	1.16
45385 Colonoscopy, fiberoptic, for removal of polyploid lesions	339	179	518	742	1.43
31603 Tracheostomy, emergency procedure; transtracheal	288	100	388	591	1.52
49505 Repair of inguinal hernia	263	213	476	732	1.54
42820 Tonsillectomy and adenoidectomy; under age 12	171	198	369	603	1.63

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 91 continued

Results of RBRVS (intra-, pre-, and post-service work, resource-based relative values (RBRV)) for four specialties; Comparison of 1986 Medicare mean submitted charges to resource-based relative values

Specialty/CPT-4 number/Service description	Intra-service work	Pre- and post-service work	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV
Thoracic and cardiovascular surgery					
90020 Office visit, comprehensive service, new patient	124	97	213	64	0.30
90240 Subsequent hospital care, brief service	36	33	67	26	0.39
90620 Initial consultation, comprehensive	122	96	210	102	0.49
43110 Esophagectomy and gastric anastomosis with vagotomy	1776	1448	3109	3123	1.00
39400 Mediastinoscopy	344	324	643	659	1.02
32480 Lobectomy, total or segmental	1125	1103	2148	2275	1.06
32020 Tube thoracostomy with water seal	108	251	346	382	1.10
31621 Bronchoscopy, diagnostic, flexible	199	225	409	471	1.15
35081 Direct repair of aneurysm, graft insertion, abdominal aorta	1452	1209	2566	2940	1.15
35301 Thromboendarterectomy	906	613	1465	2044	1.40
33405 Replacement, aortic valve, with cardiopulmonary bypass	1711	1236	2841	4029	1.42
[1]33010 Pericardiocentesis, initial	169	*	163	236	1.45
[1]32000 Thoracentesis	106	*	102	148	1.45
33512 Coronary artery bypass, three coronary arteries	1713	1264	2871	4663	1.62
33207 Insertion of permanent pacemaker, ventricular	284	359	620	1440	2.32

[1]RBRV does not include any pre- or post-operative work since CPT-4 code is for intra-operative services only.

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 92

Comparison of ratios of charges to resource-based relative values across evaluation/management for invasive, pathology and radiology services

Service	RBRV[1]	1986 Medicare mean charge[1]	1986 Florida RVS[2]	Ratio of Medicare mean charge to RBRV	Ratio of Florida RVS to RBRV
Evaluation and management					
Office intermediate visits					
Medical specialties[3]	92	$29	$33	0.32	0.36
Surgical specialties[4]	91	30	33	0.33	0.36
Office extended visits					
Medical specialties[5]	139	37	36	0.27	0.26
Surgical specialties[6]	139	33	36	0.24	0.26
Hospital, subsequent, limited					
Medical specialties[7]	64	43	33	0.67	0.52
Surgical specialties[8]	78	30	33	0.38	0.42

Table 92 continued

Comparison of ratios of charges to resource-based relative values across evaluation/management for invasive, pathology and radiology services

Service	RBRV[1]	1986 Medicare mean charge[1]	1986 Florida RVS[2]	Ratio of Medicare mean charge to RBRV	Ratio of Florida RVS to RBRV
Invasive (hospital setting)					
Coronary bypass surgery (3 graft)	2871	$4663	$4258	1.62	1.48
Hysterectomy (abdominal)	982	1542	1480	1.57	1.51
Cholecystectomy	991	1151	1200	1.16	1.21
Transurethral resection of prostate	1433	1412	1418	0.99	0.99
Appendectomy	621	703	725	1.13	1.17
Invasive (surgicenter setting)					
Colonoscopy	518	$742	$776	1.43	1.50
Dilatation and curettage (D&C)	307	421	399	1.37	1.30
Arthroscopic partial meniscectomy	905	1387	1465	1.53	1.62
Bilateral vasectomy, including post-op semen analysis	472	270	258	0.57	0.55
Rigid sigmoidoscopy	115	49	51	0.43	0.44
Excision of pigmented lesion 6x4 mm	157	62	58	0.39	0.37

Table 92 continued

Comparison of ratios of charges to resource-based relative values across evaluation/management for invasive, pathology and radiology services

Service	RBRV[1]	1986 Medicare mean charge[1]	1986 Florida RVS[2]	Ratio of Medicare mean charge to RBRV	Ratio of Florida RVS to RBRV
Pathology					
Cytologic examination of a bronchial aspirate	58	$35	$27	0.60	0.47
Examination of a frozen section on breast biopsy	114	87	88	0.76	0.77
Radiology					
Interpretation of chest x-rays	22	$20[9]	$20[9]	0.91	0.91
Interpretation of lumbar spine x-rays	33	34[9]	34[9]	1.03	1.03

[1]Values for RBRV and Medicare are specialty-specific unless otherwise noted.

[2]The Florida Relative Value Scale is not specialty-specific.

[3]Values for RBRV and Medicare are the mean of allergy/immunology, dermatology, pediatrics, family practice and rheumatology.

[4]Values for RBRV and Medicare are the mean of obstetrics/gynecology and general surgery.

[5]Values for RBRV and Medicare are the mean of allergy/immunology, internal medicine, pediatrics, family practice, and rheumatology (Medicare valu for internal medicine used for Medicare value for rheumatology).

[6]Values for RBRV and Medicare are the mean of urology and general surgery.

[7]Values for RBRV and Medicare are for pychiatry.

[h] Values for RBRV and Medicare are the mean of general surgery, orthopedic surgery, thoracic surgery, and urology.

[i] Values are for professional component only. Medicare values for Radiology are not specialty-specific.

Table 93

Intra-service work, time, and work per unit time, by category of service

Category	N[1]	Intra-service work			Intra-service time in minutes			Intra-service work/ time in minutes		
		Mean	Standard deviation	Range[2]	Mean	Standard deviation	Range[2]	Mean	Standard deviation	Range[2]
Evaluation/ management	145	108	67.1	16 - 378	35	22.1	5 - 145	3.2	0.7	1.6 - 6.1
Invasive	136	497	528.5	19 - 2445	67	67.0	4 - 328	7.1	3.3	1.9 - 19.4
Laboratory	32	48	37.9	9 - 195	13	11.3	3 - 63	3.7	0.9	2.1 - 6.3
Imaging	34	78	84.5	14 - 463	17	17.7	3 - 92	4.7	0.9	3.0 - 7.0
Anesthesia	20	230	149.8	65 - 615	115	73.0	26 - 261	2.1	0.6	1.4 - 3.6

[1]The number of study services (N) signifies the number of unique services surveyed for intra-service work.

[2]Minimum and maximum values.

Table 94

Comparison of ratios of charge to RBRVs between categories of services using results from vertical and horizontal approache

Specialty	CPT-4	Service Description	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV	Average ratio
Vertical approach (comparison of ratios within a specialty before cross-specialty linkage)						
Evaluation and management						
General surgery	90020	Office visit, comprehensive service, new patient	148	$ 48	0.32	
General surgery	90070	Office visit, extended service, established patient	77	34	0.44	
General surgery	90060	Office visit, intermediate service, established patient	37	27	0.73	
General surgery	90050	Office visit, limited service, established patient	31	23	0.74	0.56
Invasive						
General surgery	19240	Mastectomy, modified radical	903	1337	1.48	
General surgery	44145	Colectomy, partial, with coloproctostomy	1215	1927	1.59	
General surgery	44950	Appendectomy	418	703	1.68	
General surgery	47600	Cholecystectomy	615	1151	1.87	1.66

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Table 94 continued

Comparison of ratios of charge to RBRVs between categories of services using results from vertical and horizontal approache

Specialty	CPT-4	Service Description	RBRV	Medicare mean charge	Ratio of Medicare mean charge to RBRV	Average ratio
Horizontal approach (comparison of ratios across specialties after cross-specialty linkage)						
Evaluation and management						
Family practice	90020	Office visit, comprehensive service, new patient	186	53	0.28	
Internal med	90070	Office visit, extended service, established patient	131	40	0.31	
Internal med	90060	Office visit, intermediate service, established patient	78	30	0.38	
Family practice	90050	Office visit, limited service, established patient	49	21	0.43	0.35
Invasive						
General surgery	19240	Mastectomy, modified radical	1379	1337	0.97	
General surgery	44145	Colectomy, partial, with coloproctostomy	1942	1927	0.99	
General surgery	44950	Appendectomy	621	703	1.13	
General surgery	47600	Cholecystectomy	991	1151	1.16	1.06

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 95

Intra-service work[1], time, and work per unit time, by type of evaluation and management service

Type of service	N[2]	Intra-service work		Intra-service time in minutes		Intra-service work/ time in minutes	
		Mean	Range[3]	Mean	Range	Mean	Range
Office (all)	84	85	16 - 263	27	7 - 70	3.2	1.6 - 4.4
New patient	42	112	26 - 262	35	16 - 70	3.2	1.6 - 4.2
Established	42	58	16 - 127	18	7 - 38	3.2	2.3 - 4.5
Hospital	14	97	35 - 206	31	9 - 78	3.5	2.6 - 6.1
Post-op	5	46	35 - 77	11	9 - 13	4.3	3.2 - 6.1
Non post-op	9	126	58 - 206	43	18 - 78	3.0	2.6 - 3.9
Nursing home	4	79	50 - 118	25	16 - 38	3.2	3.1 - 3.3
Emergency	4	225	174 - 300	65	57 - 74	3.5	3.1 - 4.0
Consultative	20	177	76 - 378	56	22 - 145	3.3	2.1 - 5.4
Psychiatric	5	239	173 - 378	90	62 - 145	2.7	2.5 - 2.9
Non-psychiatric	15	157	76 - 290	45	22 - 59	3.4	2.1 - 5.4
Preventive	6	62	50 - 78	23	17 - 34	2.8	2.1 - 2.9
Telephone	5	39	17 - 66	8	5 - 13	4.4	3.6 - 5.4

[1]Intra-service work on a common scale.

[2]Number of services surveyed.

[3]Minimum and maximum values.

Table 96

Intra-service work[1] per unit time of evaluation and management services by specialty

Specialty	N[2]	Mean work per minute	Standard deviation (work per minute)	Range[3]
Allergy/immunology	9	2.8	0.27	2.6 - 3.5
Anesthesiology	2	3.1	0.09	3.0 - 3.2
Dermatology	8	3.1	0.26	2.7 - 3.4
Family practice	18	3.4	0.55	2.9 - 5.4
General surgery	10	3.4	0.77	2.5 - 4.7
Internal medicine	21	3.3	0.58	2.1 - 5.2
Obstetrics/gynecology	10	3.6	0.45	3.1 - 4.4
Ophthalmology	5	2.3	0.23	2.1 - 2.6
Oral/maxillofacial surgery	3	2.5	0.78	1.6 - 3.1
Orthopedics	6	3.9	0.98	3.0 - 5.4
Otolaryngology	5	3.1	0.40	2.6 - 3.5
Pediatrics	15	3.1	0.47	2.3 - 4.2
Psychiatry	24	2.7	0.47	2.1 - 4.0

Table 96 continued

Intra-service work[1] per unit time of evaluation and management services by specialty

Specialty	N[2]	Mean work per minute	Standard deviation (work per minute)	Range[3]
Rheumatology	11	3.3	0.40	2.7 - 3.8
Thoracic/cardiovascular surgery	6	3.9	1.10	3.3 - 6.1
Urology	7	3.5	0.25	3.1 - 3.8

[1]Intra-service work on a common scale.

[2]Number of evaluation and management services surveyed. Different sets of services were surveyed in different specialties.

[3]Minimum and maximum intra-service work per minute values.

Table 97

Mean intra-service time (minutes) for commonly-used evaluation and management CPT-4 codes, by specialty

CPT-4 code	Specialty														
	ai	dm	fp	gs	im	ob	op	mx	or	ot	pe	py	rh	ts	ur
90017		19			31	27			23	25					28
90020	58	25	39	41		40		43	30	30	30		60	36	38
90050	15	10	12	13	13	13	12			13	11		17		
90060	16		18	16	17	18			17		20		20		
90070	25		25	26	25	27					30		27		24
90220	75		45	37	52						46				
90250				11					10			22		13	10
90630			45	52	58		53		53			131	60		
99015			9		13										

Key to specialties:

ai Allergy/immunology
dm Dermatology
fp Family practice
gs General surgery
im Internal medicine
ob Obstetrics/gynecology
op Ophthalmology
mx Oral and maxillofacial surgery
or Orthopedic surgery
ot Otolaryngology
pe Pediatrics
py Psychiatry
rh Rheumatology
ts Thoracic/cardiovascular surgery
ur Urology

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

(Footnotes) descriptions of CPT-4 codes on previous page.

Office medical services
New patient

90017 Extended service
90020 Comprehensive service

Established Patient

90050 Limited service
90060 Intermediate service, established patient
90070 Extended service, established patient

Hospital medical services
New and established patient

Initial hospital care

90220 Comprehensive history and examination, initiation of diagnostic and treatment programs, and preparation of hospital records

Subsequent hospital care

90250 Each day, subsequent hospital care requiring; limited services

Consultations
Initial consultation

90630 Initial consultation, complex

Miscellaneous services
99015 Telephone call for consultation or medical management; lengthy or complex

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 98

Intra-service work[1] for commonly-used evaluation and management CPT-4 codes, by specialty

CPT-4 code	Specialty														
	ai	dm	fp	gs	im	ob	op	mx	or	ot	pe	py	rh	ts	ur
90017		62			90	100			69	74					94
90020	158	81	122	112		134		134	101	95	93		196	124	141
90050	40	28	36	37	38	44	31			37	31		48		
90060	47		58	44	57	66			54		70		72		
90070	86		90	92	90	101					86		99		80
90220	202		151	107	154						126				
90250				35					48			58		77	35
90630			159	219	187		108		290			330	211		
99015			49		66										

[1]Intra-service work on a common scale.

Key to specialties:

ai Allergy/immunology
dm Dermatology
fp Family practice
gs General surgery
im Internal medicine
ob Obstetrics/gynecology
op Ophthalmology
mx Oral and maxillofacial surgery
or Orthopedic surgery
ot Otolaryngology
pe Pediatrics
py Psychiatry
rh Rheumatology
ts Thoracic surgery
ur Urology

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

(Footnotes) descriptions of CPT-4 codes on previous page.

Office medical services
New patient

90017 Extended service
90020 Comprehensive service

Established patient

90050 Limited service
90060 Intermediate service, established patient
90070 Extended service, established patient

Hospital medical services
New and established patient

Initial hospital care

90220 Comprehensive history and examination, initiation of diagnostic and treatment programs, and preparation of hospital records

Subsequent hospital care

90250 Each day, subsequent hospital care requiring; limited services

Consultations
Initial consultation

90630 Initial consultation, complex

Miscellaneous services
99015 Telephone call for consultation or medical management; lengthy or complex

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 99

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90015	mx	Office visit to advise for or against removal of wisdom teeth, 18 year old male referred by orthodontist	26.3	31.6	16.4	5.9
		Office visit for 45 year old female smoker with small oral ulcer on the lateral border of tongue	50.5		18.5	
90630	gs	Initial evaluation and formulation of plan for management of multiple trauma patient with complex pelvic fracture in 35 year old male	278.9	27.5	59.1	14.0
		Emergency hospital consultation, 72 year old, new patient, with possible bowel obstruction	158.8		44.6	
90020	rh	Initial office evaluation of patient with systemic lupus erythematosus, fever, seizures and profound thrombocytopenia	262.9	34.4	69.4	16.2
		Initial office evaluation of 70 year old female with polyarthralgia	162.6	16.8	54.4	8.9
		Initial office evaluation of patient, with negative lab and x-ray studies, with question of fibrositis	149.0	23.8	50.5	15.4
		Initial office evaluation and management of patient with systemic vasculitis and compromised circulation to the limbs	249.9	27.8	70.1	17.4
		Comprehensive initial evaluation of a 48 year old man with recurrent low back pain radiating to the leg	153.5	21.5	54.1	9.4

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90520	py	Emergency room evaluation and environmental intervention on behalf of 25 year old man who is hearing voices which tell him to kill his mother, brought to hospital by brother after attempt to stab his mother. Patient refuses admission to hospital.	300.4	20.7	74.2	9.9
		Hospital emergency room evaluation of 78 year old woman who ingested alcohol and valium in an apparent suicide attempt.	197.4		60.8	
90050	fp	Office visit, established patient, 6 year old child with sore throat and headache	38.9	9.4	11.7	1.2
		Follow-up visit with 55 year old a male for management of hypertension, mild fatigue on beta blocker/thiazide regimen	43.7	23.1	14.5	25.3
		Office revisit for evaluation of 28 year old male with onychomycosis	27.4	23.0	9.0	22.2
		Office evaluation for possible purulent conjunctivitis with 1-2 day history of redness and discharge in 16 year old female, established patient	32.2	9.5	11.1	4.3
90630	py	Evaluation of 24 year old man charged with murdering a shopkeeper with regard to his competency to stand trial. You will be called upon as an expert witness	377.9	14.4	145.0	11.6
		Court-requested evaluation of juvenile who attempted to rape a 71 year old woman with regard to placement and recommended treatment	282.9		115.1	

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90020	pe	Initial visit of adolescent female with abdominal pain, new patient	90.9	2.5	29.2	1.2
		Possibility of sexual abuse in 5 year old female, new patient	112.7	20.9	34.2	15.7
		Initial office visit - evaluation of child with chronic wheezing	76.0	18.5	25.3	14.4
90847	py	Family psychotherapy session in hospital with husband of 28 year old woman with bipolar illness who periodically refuses to take Lithium. She functions well when on Lithium. The only previous time she stopped taking Lithium she required hospitalization	148.8	13.8	55.6	8.9
		Office visit for family psychotherapy session with 38 year old father accused of incestuous relations with 12 year old daughter	196.6		66.4	
90050	ob	Limited prenatal follow-up visit, no unusual complaints; interval history and examination, partial urinalysis, brief counseling	38.0	13.3	10.1	22.8
		Office visit for postpartum care 6 weeks after an uncomplicated spontaneous vaginal delivery	49.7		16.0	
90017	ur	Initial office evaluation for diagnosis and management of painless gross hematuria in new patient, without cystoscopy	89.1	5.0	27.0	2.0
		Initial evaluation and management of recurrent renal calculi in 40 year old male	111.8	19.3	29.6	7.5
		Initial evaluation and management of recurrent urinary tract infection in female	80.3	14.3	26.1	5.5

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90801	py	Office visit for diagnostic interview and evaluation of 17 year old male with recent personality change involving irritability, sleeplessness, and hostility towards parents and friends	182.5	11.8	65.9	13.7
		Office visit for diagnostic reevaluation of 68 year old female with chronic depression, unresponsive to treatment	143.9		50.1	
90017	ob	Initial office evaluation of secondary amenorrhea, in 22 year old new patient, pregnancy excluded	111.7	11.1	27.2	0.8
		Initial office visit for evaluation and counseling of a 17 year old female with primary genital herpes	89.3		27.6	
90060	ob	Extended follow-up prenatal visit at 36-37 weeks with diagnosis and management of ongoing complaints, examination including assessment of cervical change; extensive counseling regarding events requiring prompt physician contact; partial urinalysis	73.1	10.9	16.8	6.7
		Routine periodic gynecologic examination by primary care physician, established patient, without complaints	58.7		19.2	
90020	gs	Preoperative evaluation of new patient with primary hyperparathyroidism	123.6	10.9	50.4	23.9
		Comprehensive office visit for initial evaluation of a 48 year old male with recurrent low back pain radiating to the leg	99.4		31.0	

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Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service Work	Intra- service Percentage difference from the mean[2]	Intra- service Time[3]	Intra- service Percentage difference[2]
90017	im	Initial office evaluation for diagnosis and management of painless gross hematuria in new patient, without cystoscopy	99.4	10.6	35.2	14.9
		Initial evaluation and management of recurrent urinary infection in female	80.3		26.1	
90050	im	Follow-up visit of a 55 y.o. male for management of hypertension, mild fatigue, on beta blocker/thiazide regimen	43.7	15.9	14.5	12.3
		Office evaluation for possible purulent bacterial conjunctivitis with 1-2 day history of redness and discharge in 16 year old female, established patient	32.2	14.8	11.1	14.2
		Office visit, sore throat, fever, and fatigue in 19 year old college student, established patient	37.3	1.2	13.1	1.9
90020	ob	Initial office visit of 34 year patient with primary infertility, including counseling	146.2	9.1	40.4	2.1
		Initial visit for pregnancy in 25 year old primigravida, new patient, including history and physical, record preparation, risk assessment, routine prenatal laboratory evaluation, education and counseling, vitamin prescription	121.8		38.8	
90070	ob	Office evaluation of new onset right lower quadrant pain in 32 year old woman, established patient	92.1	8.5	25.6	4.9
		Office visit for counseling with a 25 year old primigravida with family history of Downs Syndrome	109.1		28.2	

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90844	py	Second office visit after a referral from an internist of a 25 year old male suffering from panic attacks	102.9	5.4	43.7	5.6
		Follow-up psychotherapy office visit with 48 year old housewife for treatment of agoraphobia	102.1	6.2	46.0	0.6
		Office visit for termination of 66 year old business executive from twice weekly in-office psychotherapy sessions after three years of psychotherapy. Patient had initial complaint of marital problems and "ulcers"	113.9	4.7	49.8	7.6
		Weekly medical psychotherapy and pharmacotherapy office visit for a 36 year old woman who emigrated from Russia leaving her family behind. She presented initially with daily headaches which recently have been relieved with anti-depressant medication	99.8	8.2	41.9	9.4
		Office visit for individual psychoanalysis with a 42 year old surgeon with a passive-aggressive personality disorder - fifth visit	125.1	15.0	49.9	7.9
90260	im	Follow-up hospital visit, day 2, patient with non-dominant CVA with mild hemiparesis	60.0	7.8	17.6	1.2
		Hospital visit, day 3 post admission, 65 year old male with uncomplicated MI, established patient	70.1		18.1	

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90020	dm	Initial office evaluation of adult with chronic recurrent hives, new patient	74.9	7 3	23.3	5.5
		Initial comprehensive evaluation of 30 year old woman with symptoms of subacute cutaneous LE	86.8		26.1	
90020	ts	Extensive initial office evaluation of 70 year old woman with increasing dysphagia	131.5	6.1	38.4	5.9
		Initial office evaluation of 50 year old male with aortic aneurysm, with respect to recommendation for surgery	113.4	8.5	34.8	4.1
		Evaluation of a 65 y.o. male, new patient, with chronic stable angina and coronary artery disease, referred by cardiologist for coronary bypass surgery	126.8	2.4	35.6	1.9
90050	pe	Office visit, established patient, 6 year old child with sore throat and headache	29.1	5.0	10.8	1.0
		Office evaluation for possible purulent bacterial conjunctivitis with 1-2 day history of redness and discharge in 16 year old female (established patient)	32.2		11.1	
90017	dm	Initial office visit, for evaluation and counseling of 17 year old female with primary genital herpes	65.6	5.6	19.4	3.5
		Initial office visit, 35 year old male with complaint of alopecia	58.6	5.7	17.7	5.4
		Initial office visit, 16 year old male with severe cystic acne, new patient	62.2	0.1	19.0	1.9

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90017	ot	Initial office evaluation for gradual hearing loss in 58 year old male, history and physical, evaluation with interpretation of complete audiogram, air bone conduction reflexes, speech reception thresholds and discrimination	71.7	3.3	27.9	11.9
		Evaluation of hoarseness and dysphagia in 65 year old male including history and physical	76.6		22.0	
90050	dm	Follow-up visit with 48 year old male for ongoing management of psoriasis not PUVA treatment	29.1	3.1	10.4	7.2
		Office revisit for evaluation of 28 year old male with onychomycosis	27.4		9.0	
90020	ai	Initial office visit for evaluation of child with chronic wheezing	151.6	3.7	56.9	2.0
		Evaluation of 6 year old male with multiple infections, new patient	162.0	3.0	60.2	3.7
		Initial office evaluation of adult with chronic recurrent hives, new patient	158.3	0.6	57.0	1.7
90070	im	Office evaluation of new onset right lower quadrant pain in a 32 year old woman, established patient	92.1	2.3	25.6	3.3
		Office evaluation of 28 year old patient with regional enteritis, diarrhea, and low grade fever, established patient	88.0		23.9	

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90070	fp	Office evaluation of new onset right lower quadrant pain in 32 year old woman, established patient	92.1	2.3	25.6	3.3
		Office evaluation of 28 year old patient with regional enteritis, diarrhea and low grade fever, established patient	88.0		23.9	
90050	rh	Follow-up office visit of patient with ARA anatomical Stage II,and ARA functional Class II, rheumatoid arthritis	47.0	2.1	17.4	0.4
		Limited office visit for established patient with known osteoarthritis and painful swollen knees	49.0		17.2	
90620	py	Hospital consultation for psychiatric evaluation of a 68 year old cardiac surgical patient with severe post-op depression	172.5	2.8	62.5	0.3
		Office consultation for psychiatric evaluation of 65 year old male with intellectual deterioration and behavior problems including verbal and physical of co-workers	181.5	2.3	61.8	1.3
		Evaluation and level of care decision for 17 year old adolescent newly diagnosed schizophrenic with first psychiatric hospital admission. Patient has been hospitalized for 90 days with minimal functional improvement	178.5	0.6	63.6	1.5

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90020	ot	Evaluation of recurrent dizziness and vertigo in 48 year old female, including history and physical, new patient, lab tests not included	96.6	1.6	28.0	6.5
		Rhinoplasty evaluation, 25 year old female, including history, physical and prolonged counseling, new patient	93.5		31.9	
90020	or	Comprehensive initial office visit for evaluation of 13 year old female with progressive scoliosis	102.6	1.6	29.3	2.8
		Comprehensive office visit for initial evaluation of 48 year old man with recurrent low back pain radiating to the leg	99.4		31.0	
90220	ai	Direct hospital admission for care of young adult patient, who has failed previous therapy and now presents in acute asthmatic attack	199.1	1.6	71.4	4.2
		Direct hospital admission of 62 year old smoker, established patient, with bronchitis, in acute respiratory distress	205.5		77.6	

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Table 99 continued

Intra-service work[1] and intra-service time for different services surveyed within the same CPT-4 code and specialty

CPT-4 code	Specialty	Service description	Intra- service			
			Work	Percentage difference from the mean[2]	Time[3]	Percentage difference[2]
90060	fp	Routine periodic gynecologic exam, by primary care physician, 24 year old established patient, without complaints	58.7	1.6	19.2	6.7
		Office visit with 45 year old male, established patient, with chronic asthma, on chronic steroid and bronchodilator therapy	56.9		16.8	

[1]Intra-service work on a common scale.

[2]Percent difference from the mean intra-service work value or time value for different services in a specialty coded the same and listed here.

[3]All times are geometric means of estimates in minutes for the intra-service portion from a survey of approximately 100 physicians in each specialty.

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Table 100

Surveyed total work for evaluation and management services, by specialty[1]

CPT		AI	DM	FP	GS	IM	MX	OB	OP	OR	OT	PE	PY	RH	TS	UR
Office medical services, new patient																
90000	Brief service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90010	Limited service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90015	Intermediate service	---	---	---	---	---	66	---	---	---	---	---	---	---	---	---
90017	Extended service	---	90	---	---	126	---	144	---	99	114	---	---	---	---	139
90020	Comprehensive service	244	118	185	218	---	235	209	---	154	145	142	---	302	220	231
Office medical services, established patient																
90030	Minimal service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90040	Brief service	---	---	---	---	---	---	---	---	---	---	24	---	---	---	---
90050	Limited service	60	40	48	54	51	---	63	45	---	49	42	---	68	---	---
90060	Intermediate service	66	---	85	64	80	---	99	---	87	---	105	---	107	---	---
90070	Extended service	123	---	134	138	134	---	149	---	---	---	133	---	148	---	121
90080	Comprehensive service	---	---	---	---	204	---	---	---	---	---	---	---	---	---	---
Hospital medical services, new and established patient																
Initial hospital care																
90200	Brief hx & exam	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90215	Intermediate hx & exam	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90220	Comprehensive Hx & Exam	323	---	247	183	231	---	---	---	---	---	191	---	---	---	---
90225	Hx & Exam Of Normal Newborn	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Subsequent hospital care, each day																
90240	Brief service	---	---	---	---	---	---	---	---	---	---	---	---	---	68	---
90250	Limited service	---	---	---	52	---	---	---	---	71	---	---	94	---	120	54
90260	Intermediate service	---	---	---	---	99	---	---	---	---	---	---	---	---	---	---
90270	Extended service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90280	Comprehensive service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90282	Normal newborn service	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90285	(old 1986 code normal newborn)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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Table 100 continued

Surveyed total work for evaluation and management services, by specialty[1]

CPT	AI	DM	FP	GS	IM	MX	OB	OP	OR	OT	PE	PY	RH	TS	UR
Hospital discharge services															
90292 Discharge day management	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

[1] Key to specialties: AI allergy/immunology, DM dermatology, FP family practice, GS general surgery, IM internal medicine, MX oral/maxillofacial surgery, OB obstetrics/gynecology, OP ophthalmology, OR orthopedic surgery, OT otolaryngology, PE pediatrics, PY pathology, RH rheumatology, TS thoracic/cardiovascular surgery, UR urology.

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Table 101

Intra-, and pre- and post-operative work and time, and intra-operative work and time as percents of total work and time for invasive procedures

Procedure	Work[1]				Time in minutes			
	Intra	Pre & post	Total	Intra percent[2]	Intra	Pre & post	Total	Intra percent[3]
General surgery								
Total esophagectomy, gastroesophageal anastmosis	1,776	1,448	3,224	55	248	333	581	43
Low anterior resection for rectal carcinoma	1,174	768	1,942	60	152	190	342	44
Modified radical mastectomy	768	610	1,379	56	103	156	259	40
Cholecystectomy for cholelithiasis	607	384	991	61	64	134	198	32
Appendectomy, acute abdomen	326	294	621	53	37	108	144	25
Uncomplicated indirect inguinal hernia repair	263	213	476	55	41	96	138	30
Chest tube insertion spontaneous pneumothorax	108	251	359	30	15	108	123	12
Oral and maxillofacial surgery								
LeFort one maxillary and sagittal split mandibular osteotomies	1,974	1,195	3,169	62	253	293	546	46
Bilateral sagittal osteotomies, mandibular ramus	1,176	969	2,145	55	139	244	383	36
Open surgical treatment complex mandibular fracture, including fixation	955	849	1,804	53	129	208	337	38
Open treatment of multiple fractures of zygomatic arch and malar tripod	908	844	1,752	52	123	207	330	37
Closed reduction of mandibular fracture by manipulation and intermaxillary fixation	467	413	880	53	64	144	208	31
Removal 4 impacted (full bony) wisdom teeth	342	302	644	53	49	110	159	31
Extraction of 10 erupted mandibular teeth	213	247	460	46	32	97	128	25

Table 101 continued

Intra-, and pre- and post-operative work and time, and intra-operative work and time as percents of total work and time for invasive procedures

Procedure	Work[1]				Time in minutes			
	Intra	Pre & post	Total	Intra percent[2]	Intra	Pre & post	Total	Intra percent[3]
Obstetrics and gynecology								
Vaginal hysterectomy, anterior and posterior colporrhaphy	545	475	1,020	53	106	161	267	40
Abdominal hysterectomy, cancer of cervix	504	454	958	53	90	154	244	37
Uncomplicated cesarean delivery, cephalopelvic disproportion	367	380	747	49	51	132	184	28
Ovarian cystectomy, unilateral, uncomplicated	307	357	664	46	53	125	178	30
Intracavitary radioelement application patient with cervical cancer	186	233	419	44	34	103	137	25
Ophthalmology								
Penetrating keratoplasty, cataract extraction and intraocular lens implant	1,220	862	2,082	59	101	211	313	32
Scleral buckle, without vitrectomy, primary	1,028	800	1,828	56	94	197	292	32
Extracapsular cataract extraction with intraocular lens implant	846	734	1,580	54	53	183	236	22
Secondary lens implant, without vitrectomy	597	509	1,107	54	39	173	212	18
Commitant strabismus surgery, primary	532	434	966	55	51	149	200	25
Refractive surgery, radial keratotomy	512	406	918	56	31	141	172	18
2-lid blepharoplasty, both upper lids	443	422	865	51	73	145	218	33
Orthopedic surgery								
Primary total hip replacement	1,486	876	2,363	63	128	211	339	38
Laminectomy for decompression of spinal cord	1,435	781	2,216	65	155	193	348	45
Unilateral lumbar laminectomy	1,074	634	1,709	63	86	161	246	35
Open reduction and internal fixation, intertrochanteric fracture	881	829	1,710	52	73	200	273	27

Table 101 continued

Intra-, and pre- and post-operative work and time, and intra-operative work and time as percents of total work and time for invasive procedures

Procedure	Work[1]				Time in minutes			
	Intra	Pre & post	Total	Intra percent[2]	Intra	Pre & post	Total	Intra percent[3]
Otolaryngology								
Laryngectomy, with radical neck dissection	1,643	1,083	2,726	60	258	258	517	50
Parotidectomy, lateral lobe, with dissection	1,102	553	1,655	67	156	143	299	52
Tympanoplasty with mastoidectomy for cholesteatoma	1,070	877	1,947	55	175	213	388	45
Septorhinoplasty, primary rhinoplasty	764	543	1,307	58	115	182	297	39
Uvulopalatal pharyngoplasty	416	406	821	51	63	140	203	31
Unilateral Caldwell-luc procedure	350	362	713	49	49	128	176	28
Direct laryngoscopy with biopsy	212	235	448	47	24	105	128	18
Tonsillectomy and adenoidectomy	171	198	369	46	30	91	120	25
Closed reduction of nasal fracture	155	162	317	49	25	77	102	24
Thoracic surgery								
Primary 3-vessel coronary artery bypass graft	1,713	1,265	2,978	58	200	294	494	40
Primary aortic valve replacement	1,711	1,236	2,947	58	186	288	475	39
Repair of ventral septal defect	1,566	1,003	2,569	61	163	242	404	40
Prosthetic graft replacement, aortic aneurysm	1,452	1,209	2,662	55	167	283	450	37
Left upper pulmonary lobectomy	1,125	1,103	2,227	50	130	260	390	33
Carotid endarterectomy, unilateral	906	613	1,519	60	98	157	254	38
Insertion, management, removal, balloon pump, post coronary artery bypass graft	550	467	1,017	54	89	159	247	36
Mediastinoscopy	344	324	667	51	46	116	162	28
Permanent single chamber cardiac pacemaker	284	359	643	44	47	126	173	27
Initial pericardiocentesis	169	285	453	37	24	120	144	17
Thoracentesis	106	218	324	33	26	98	124	21

Table 101 continued

Intra-, and pre- and post-operative work and time, and intra-operative work and time as percents of total work and time for invasive procedures

Procedure	Work[1]				Time in minutes			
	Intra	Pre & post	Total	Intra percent[2]	Intra	Pre & post	Total	Intra percent[3]
Urology								
Total cystectomy and ileal loop	2,426	1,296	3,722	65	328	305	633	52
Percutaneous nephrostolithotomy	1,167	697	1,864	63	116	175	291	40
Transurethral resection of prostate	919	469	1,388	66	62	161	223	28
Ureteroscopy with removal of calculus	835	535	1,370	61	75	180	255	30
Insertion penile prosthesis	692	492	1,184	58	66	167	233	28
Fulguration and resection of medium bladder tumor, 2-5 cm	519	416	936	56	37	144	181	21
Cystoscopic laser therapy for bladder tumor	435	387	822	53	35	135	170	20
Cystourethroscopy with insertion of indwelling ureteral stent	226	247	473	48	31	109	140	22

[1]Work values are on a relative scale, and it is valid to compare them across procedures, across specialties, and across pre-, post-, and intra-operative periods. Methods of development of this cross-specialty scale of work are described elsewhere (Chapter 6).

[2]Work intra percent is intra-operative work multiplied by 100, divided by total work.

[3]Time intra percent" is intra-operative time multiplied by 100, divided by total time.

Table 102

Minimum and maximum of work, time, and work per minute procedures for invasive procedures

OBS	SP[2]	Setting[3]	Number of procedures	Work[1]		Time in minutes		Work per unit time	
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	gs	hospital	11	108	1,776	15	248	5	13
2	gs	other	3	141	339	25	57	6	7
3	mx	hospital	8	213	1,974	32	253	7	8
4	mx	other	3	615	1,056	51	114	7	12
5	ob	hospital	6	186	545	34	106	5	7
6	ob	other	4	101	224	13	30	6	8
7	op	hospital	7	443	1,220	31	101	6	17
8	op	other	3	48	680	14	49	4	14
9	or	hospital	4	881	1,486	73	155	9	13
10	or	other	4	193	557	28	66	6	9
11	ot	hospital	12	155	1,965	24	319	6	16
12	ot	other	2	104	199	14	29	7	7
13	ts	hospital	15	106	2,444	15	282	4	13
14	ts	other	1	199	199	29	29	7	7
15	ur	hospital	9	226	2,426	31	328	7	15
16	ur	other	2	92	253	13	41	6	7

[1]Work values are on a relative scale, and it is valid to compare them across procedures, across specialties, and across pre-, post-, and intra-operative periods. Methods of development of this cross-specialty scale of work are described elsewhere (2,3,6,7).

[2]Specialty abbreviations are as follow: gs general surgery, mx oral and maxillofacial surgery, ob obstetrics and gynecology, op ophthalmology, or orthopedic surgery, ot otolaryngology, ts thoracic surgery, and ur urology.

[3]The setting "other" includes surgicenter and office-based care.

Table 103

Resource-based relative values, charges, and ratio of charges to RBRV for invasive procedures

Specialty[1]/Procedure		RBRVS 1	RBRVS 2[2]	Office visits	Charge $	Ratio 1	Ratio 2	Work per unit time
High ratio 1								
ts	Permanent single chamber cardiac pacemaker	620	669	49	1,440	2.32	2.15	6.04
ot	Uvulopalatal pharyngoplasty	872	1,006	135	1,642	1.88	1.63	6.63
ob	Ovarian cystectomy, unilateral, uncomplicated	680	814	135	1,186	1.74	1.46	5.78
ts	Primary 3-vessel coronary artery bypass graft	2,871	3,183	312	4,663	1.62	1.47	8.58
ob	Abdominal hysterectomy, cancer of cervix	982	1,293	312	1,542	1.57	1.19	5.61
gs	Uncomplicated indirect inguinal hernia repair	476	610	135	732	1.54	1.20	6.34
ob	Vaginal hysterectomy, anterior and posterior colporrhaphy	1,045	1,241	196	1,607	1.54	1.29	5.12
ts	Repair of ventral septal defect	2,477	2,789	312	3,601	1.45	1.29	9.63
ob	Uncomplicated cesarean, cephalopelvic disproportion	765	765	0	1,088	1.42	1.39	7.14
ts	Primary aortic valve replacement	2,841	3,153	312	4,029	1.42	1.28	9.18
ot	Unilateral Caldwell-luc procedure	756	945	189	1,065	1.41	1.13	7.19
ts	Carotid endarterectomy, unilateral	1,465	1,653	189	2,044	1.40	1.24	9.26
ot	Septorhinoplasty, primary rhinoplasty	1,387	1,576	189	1,936	1.40	1.23	6.62
op	Secondary lens implant, without vitrectomy	1,116	1,427	312	1,459	1.31	1.02	15.40
mx	Extraction of 10 erupted mandibular teeth	467	467	0	600	1.28	1.28	6.71
op	Extracapsular cataract extraction with intraocular lens implant	1,592	1,904	312	2,000	1.26	1.05	16.05
ob	Intracavitary radioelement application patient with cervical cancer	429	617	189	524	1.22	0.85	5.54
ot	Tonsillectomy and adenoidectomy	392	527	135	473	1.21	0.90	5.74
ur	Insertion penile prosthesis	1,222	1,357	135	1,473	1.21	1.09	10.48

Resource-based relative values, charges, and ratio of charges to RBRV for invasive procedures

Specialty[1]/Procedure		RBRVS 1	RBRVS 2[2]	Office visits	Charge $	Ratio 1	Ratio 2	Work per unit time
Medium ratio 1								
op	Scleral buckle, without vitrectomy, primary	1,842	2,154	312	2,165	1.18	1.01	10.90
gs	Cholecystectomy for cholelithiasis	991	1,187	196	1,151	1.16	0.97	9.49
ts	Prosthetic graft replacement, aortic aneurysm	2,566	2,878	312	2,940	1.15	1.02	8.71
ot	Laryngectomy, with radical neck dissection	2,894	3,205	312	3,119	1.08	0.97	6.36
ts	Left upper pulmonary lobectomy	2,148	2,459	312	2,275	1.06	0.93	8.62
or	Primary total hip replacement	2,903	3,215	312	3,044	1.05	0.95	11.62
op	Commitant strabismus surgery, primary	973	1,285	312	1,007	1.03	0.78	10.46
ts	Mediastinoscopy	643	753	110	659	1.02	0.87	7.52
or	Laminectomy for decompression of spinal cord	2,723	3,035	312	2,768	1.02	0.91	9.25
ot	Closed reduction nasal fracture	337	385	49	337	1.00	0.87	6.23
ur	Transurethral resection of prostate	1,433	1,683	250	1,412	0.99	0.84	14.77
mx	Closed reduction of mandibular fracture by manipulation and intermaxillary fixation	894	1,066	172	869	0.97	0.82	7.26
ot	Direct laryngoscopy with biopsy	475	572	97	462	0.97	0.81	8.96
gs	Modified radical mastectomy	1,379	1,629	250	1,337	0.97	0.82	7.47
mx	Removal 4 impacted (full bony) wisdom teeth	654	764	110	623	0.95	0.81	6.94
or	Unilateral lumbar laminectomy	2,100	2,296	196	1,914	0.91	0.83	12.56
mx	Open treatment of multiple fractures of zygomatic arch and malar tripod	1,780	1,951	172	1,622	0.91	0.83	7.38
mx	Open surgical treatment complex mandibular fracture, including fixation	1,832	2,004	172	1,667	0.91	0.83	7.40

Table 103 continued

Resource-based relative values, charges, and ratio of charges to RBRV for invasive procedures

	Specialty[1]/Procedure	RBRVS 1	RBRVS 2[2]	Office visits	Charge $	Ratio 1	Ratio 2	Work per unit time
Low ratio 1								
ot	Tympanoplasty with mastoidectomy for cholesteatoma	2,066	2,201	135	1,858	0.90	0.84	6.11
op	2-lid blepharoplasty, both upper lids	872	1,006	135	781	0.90	0.78	6.08
ur	Fulguration and resection of medium bladder tumor, 2-5 cm	966	1,223	258	847	0.88	0.69	13.96
ur	Percutaneous nephrostolithotomy	1,924	2,120	196	1,664	0.86	0.78	10.02
ur	Cystourethroscopy with insertion of indwelling ureteral stent	488	684	196	419	0.86	0.61	7.16
gs	Low anterior resection for rectal carcinoma	1,942	2,192	250	1,666	0.86	0.76	7.73
gs	Chest tube insertion spontaneous pneumothorax	359	469	110	296	0.83	0.63	7.10
gs	Total esophagectomy, gastroesophageal anastmosis	3,224	3,536	312	2,640	0.82	0.75	7.16
or	Open reduction and internal fixation, intertrochanteric fracture	2,101	2,272	172	1,701	0.81	0.75	12.03
ot	Parotidectomy lateral lobe with dissection	1,757	1,953	196	1,398	0.80	0.72	7.05
ts	Initial pericardiocentesis	437	694	258	332	0.76	0.48	6.93
ur	Total cystectomy and ileal loop	3,842	4,153	312	2,850	0.74	0.69	7.40
mx	Bilateral sagittal osteotomies, mandibular ramus	2,179	2,351	172	1,609	0.74	0.68	8.46
op	Refractive surgery, radial keratotomy	925	1,237	312	629	0.68	0.51	16.57
gs	Appendectomy, acute abdomen	621	871	250	417	0.67	0.48	8.92
ur	Cystoscopic laser therapy for bladder tumor	849	1,160	312	511	0.60	0.44	12.60
ts	Thoracentesis	312	570	258	148	0.47	0.26	4.11
ur	Ureteroscopy with removal of calculus	1,414	1,610	196	589	0.42	0.37	11.08

[1]Specialty abbreviations are as follow: gs general surgery, mx oral and maxillofacial surgery, ob obstetrics and gynecology, op ophthalmology, or orthopedic surgery, ot otolaryngology, ts thoracic surgery, and ur urology.

[2]RBRVS 2 and Ratio 2 include pre-admission and post-discharge office visits; RBRVS 1 and Ratio 1 do not include them.

Table 104

Comparison of resource-based relative values, 1986 mean Medicare submitted charges, and 1986 Ontario schedule of fees

Type of service	RBRV[1]	Mean Medicare charge[1]	Ontario Fee	Ratio of Medicare mean charge to RBRV	Ratio of Ontario fee to RBRV
Evaluation and management[2]					
Office visit, limited service, established patient	49	$21	$18	0.43	0.37
Office visit, intermediate service, established patient	85	24	26	0.28	0.31
Office visit, extended service, established patient	135	33	31	0.24	0.23
Office visit, comprehensive service, new patient	186	53	53	0.28	0.28
Initial consultation, complex	283	86	57	0.30	0.20

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 104 continued

Comparison of resource-based relative values, 1986 mean Medicare submitted charges, and 1986 Ontario schedule of fees

Type of service	RBRV[1]	Mean Medicare charge[1]	Ontario Fee	Ratio of Medicare mean charge to RBRV	Ratio of Ontario fee to RBRV
Invasive					
Repair of inguinal hernia	476	$ 732	$ 294	1.54	0.62
Colonoscopy with lesion removal	518	742	235	1.43	0.45
Panretinal photocoagulation	694	890	192	1.28	0.28
Transurethral resection of prostate	1,433	1,412	470	0.99	0.33
Carotid endarterectomy	1,465	2,044	790	1.40	0.54
Removal of cataract with insertion of intraocular lens prosthesis	1,592	2,000	583	1.26	0.37
Repair of femur fracture	2,101	1,701	532	0.81	0.25
Coronary artery bypass, 3 grafts	2,871	4,663	1,445	1.62	0.50
Total hip replacement	2,903	3,044	1,051	1.05	0.36
Pathology					
Cytologic examination of a bronchial aspirate	58	35	16	0.60	0.28
Examination of a frozen section on breast biopsy	114	87	39	0.76	0.34

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

Table 104 continued

Comparison of resource-based relative values, 1986 mean Medicare submitted charges, and 1986 Ontario schedule of fees

Type of service	RBRV[1]	Mean Medicare charge[1]	Ontario Fee	Ratio of Medicare mean charge to RBRV	Ratio of Ontario fee to RBRV
Radiology					
Interpretation chest x-ray, two views	22	$ 203[3,4]	$ 10[3]	0.91	0.45
Interpretation of x-ray lumbar spine	33	34[3,4]	12[3]	1.03	0.36
Interpretation mammography, bilateral	59	39[3,4]	20[3]	0.66	0.34
Cat scan of abdomen, with contrast	120	129[3,4]	104[3]	1.07	0.87
Echography of the abdomen, complete	132	101[4]	87	0.77	0.66

[1]Values for RBRV and Medicare are specialty-specific unless otherwise noted.

[2]Evaluation and management data are for Family Practice only.

[3]Values are for professional component only.

[4]Medicare values for Radiology are not specialty-specific.

NOTE: CPT-4 five digit codes and/or nomenclature are copyright 1987 American Medical Association.

References

Adams, E.K., Burfield, W.B.: Malpractice premiums: Another "crisis" and its implications. Med Practice Man 3; pp 22-30, 1988.

American Association of Oral and Maxillofacial Surgeons: Selected and Comparative Data on Oral and Maxillofacial Surgery. Chicago. American Association of Oral and Maxillofacial Surgeons, 1982. p 13.

American Board of Medical Specialties. Annual Report & Reference Handbook - 1984. Evanston. American Board of Medical Specialties, 1984.

American Medical Association. House of Delegates Resolution 76, 1984a.

American Medical Association: Medical Groups in the U.S., 1984. Chicago. American Medical Association, 1984b.

American Medical Association: Medicare Physician Reimbursement: An AMA Perspective. Chicago. American Medical Association, 1987a.

American Medical Association Center for Health Policy Research: Socioeconomic Characteristics of Medical Practice 1987. Chicago. American Medical Association, 1987b.

American Medical Association Center for Health Policy Research: The Demographics of Physician Supply: Trends and Projections. Chicago. American Medical Association, 1987c.

American Medical Association Center for Health Policy Research: 1988-89 Directory of Graduate Medical Education Programs. Chicago. American Medical Association, 1988.

American Medical Association Center for Health Policy Research: Physician Marketplace Statistics 1988. Chicago. American Medical Association Center, 1988a.

American Medical Association Center for Health Policy Research in cooperation with the Division of Survey and Data Resources and the Governing Council of the AMA Resident Physicians Section: Survey of Resident Physicians. Chicago. American Medical Association, 1987.

American Society of Anesthesiologists: Relative Value Guide, 1987. Park Ridge. American Society of Anesthesiologists, 1987.

American Society of Internal Medicine: Reimbursement for Physicians' Cognitive and Procedural Services: A White Paper.

Washington, D.C. American Society of Internal Medicine, January 1981.

Anderberg, M.R.: Cluster Analysis for Applications. New York. Academic Press Inc., 1973.

Becker, E.R., Dunn, D., Hsiao, W.C.: Relative cost differences among physician specialty practice. JAMA 1988 (In press).

Becker, G.S.: Human Capital. New York. Columbia University Press, 1964.

Becker, G.S.: Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Training. 2nd ed. New York. Columbia University Press, 1975.

Board of Trustees, Federal Hospital Insurance Trust Fund: 1984 Annual Report of the Board of Trustees of the Federal Hospital Insurance Trust Fund. Washington, DC., April 1984.

Board of Trustees, Federal Supplementary Medical Insurance Trust Fund: 1984 Annual Report of the Board of Trustees of the Federal Supplementary Medical Insurance Trust Fund. Washington, DC., April 1984.

Bohrnstedt, G.W.: A quick method for determining the reliability and validity of multiple-item scales. Am Sociol Rev 34:542-548, 1969.

Braun, P., Hsiao, W.C., Becker, E.R., et al.: Evaluation and management services in the resource-based relative value scale. JAMA 1988 (In press).

Braun, P., Yntema, D., Dunn, D., et al.: Cross-specialty linkage of resource-based relative value scales: Linking specialties by services and procedures of equal work. JAMA 1988 (In press).

Brown, L.: Politics as usual and customary? Physician payment in transition. In Report on Conference: Reforming Physician Payment. Washington, DC. Institute of Medicine, 1984.

Burney, I., Hickman, P., Paradise, J., et al: Medicare physician payment, participation, and reform. Health Aff 3:5-24, 1984.

Caplan, C.M.: How and when to raise fees. Physician's Management 27:191-200, 1987.

Chassin, M.R., Kosecoff, J., Park, R.E., et al: Does inappropriate use explain geographic variations in the use of health care services? A study of three procedures. JAMA 258:2533-2537, 1987.

Chow, G.C.: Tests of equality between subsets of coefficients in two linear regressions. Econometrica 28:591-605, 1960.

Committee on Governmental Affairs, U.S. Senate: The California Relative Value Studies on Overview and the California Physician Services, the Corporation and its Relationship with the California Medical Association. Washington, D.C. Committee on Governmental Affairs, April 1979.

Coy, J.A., Fanta, C.M., Finkel, A.J., et al Physician's Current Procedural Terminology 1988. Chicago. American Medical Association, 1988.

Cromwell, J., Hurdle, S., Mitchell, J., et al.: Using Relative Physician Effort to Identify Mispriced Procedures, Draft Final Report to US Dept. of Health and Human Services under HHS Research Contract No. 100-86-1123. Needham, MA. December 7, 1987.

Cromwell, J., Mitchell, J.B.: Physician induced demand for surgery. J of Health Econ 5(4):295-313, 1986.

Cronbach, L.J.: Coefficient alpha and internal structure of tests. Psychometrika 16:297-334, 1951.

Dempster, A.P., Laird, N.M., and Rubin, D.B.: Maximum likelihood estimation via the EM algorithm. JASA 61:595-604, 1966.

Dempster, A.P., Laird, N.M., and Rubin, D.B.: Maximum likelihood for incomplete data via the EM algorithm (with discussion). J Roy Stat Soc B39:1-38, 1977.

Dixon, W.J., Brown, M.B., Engelman, L., et al.: BMDP Statistical Software 1983 Printing with Additions. Berkeley. University of California Press, 1983, pp 207-234.

Dunn, D., Hsiao, W.C., Ketcham, T.R., et al.: A method for estimating the pre- and post-service work of physicians' services. JAMA 1988 (In press).

Egdahl, R.G., and Manuel, B.: A consensus process to determine the relative complexity-severity of frequently performed surgical services. Surg Gynecolo Obstet 160:403-406, 1985.

Egdahl, R.H., and Hertenstein, R.D.: An access-oriented negotiated fee schedule. The Caterpillar Experience. Ann Surg 206:349-357, 1987.

Eisenberg, J.M.: Doctors' Decisions and the Costs of Medical Care. Ann Arbor, MI. Health Administration Press, 1986.

Fanta, C.M., Finkel, A.J., Kirshner, C.G., et al: Physicians' Current Procedural Terminology. 4th ed. Chicago. American Medical Association, 1986.

Fraser, P.S.: Overview of the Allocation Process. Remarks made to the Physician Payment Review Commission. Washington D.C. April 9, 1987.

Fuchs, V.R.: Who Shall Live? Health, Economics, and Social Choice. New York. Basic Books, 1974.

Graduate Medical National Advisory Committee: Summary Report to the Secretary, DHHS Publication No. (HRA) 86-651. Washington, D.C. U.S. Government Printing Office, 1981.

Greenspan, A.M., Kay, H.R., Berger, B.C., et al: Incidence of unwarranted implantation of permanent cardiac pacemakers in a large medical population. N Engl J Med 318:158-163, 1988.

Hadley, J., Juba, D., Berenson, R., et al.: Final Report on Alternative Methods of Developing a Relative Value Scale of Physicians' Services. Washington, D.C. The Urban Institute, October 1984.

Hadley, J., and Berenson, R.A.: Seeking the just price: Constructing relative value scales and fee schedules. Ann Intern Med 106:461-466, 1987.

Hartigan, J.A.: Clustering Algorithms. New York: Wiley, 1975.

Havighurst, C.C., Kissam, P.C.: The antitrust implications of relative value studies in medicine. J Health Polit Policy Law 4:48-86, 1979.

Health Care Financing Administration: The Common Procedure Coding System. Washington, D.C. U.S. Government Printing Office, 1985.

Holoweiko, M.: Non-surgeons earnings: Which specialties are hung up? Med Econ 63(3):206-225, 1986.

Hsiao, W.C., and Stason, W.: Toward developing a relative value scale for medical and surgical services. Health Care Financ Rev 1:23-28, 1979.

Hsiao, W.C., Braun, P., Goldman, P., et al: Resource-Based Relative Values of Selected Medical and Surgical Procedures in Massachusetts: Final Report on Research Contract for Rate Setting Commission, Commonwealth of Massachusetts. Boston. Harvard School of Public Health, 1985.

Hsiao, W.C., Braun, P., Becker, E.R., et al.: The resource-based relative value scale: Toward the development of an alternative physician payment scale. JAMA 258:799-802, 1987.

Hsiao, W.C., Braun, P., Becker, E.R., et al.: A National Study of Resource-Based Relative Value Scales for Physician Services: Final Report to the Health Care Financing Administration, No. 18-C-98795/1-03. Boston. Harvard School of Public Health, September 1988.

Hsiao, W.C., Braun, P., Dunn, D., et al.: Resource-based relative values: An overview. JAMA 1988 (In press).

Hsiao, W.C., Braun, P., Kelly, N., et al: Results, potential effects, and implementation issues of the resource-based relative value scale. JAMA 1988 (In press).

Hsiao, W.C., Braun, P., Yntema, D., et al.: Estimating physician work for the resource-based relative value scale. N Engl J Med September 1988 (In press).

Hsiao, W.C., Braun, P., Yntema, D., et al.: Results and policy implications of the resource-based relative value study. N Engl J Med September 1988 (In press).

Hsiao, W.C., Braun, P., Yntema, D., et al.: Measurement and analysis of intra-service work. JAMA 1988 (In press).

Hsiao, W.C., Couch, N., Causino, N.A., et al.: Resource-based relative values for invasive procedures in eight surgical specialties. JAMA 1988 (In press).

Hughes, E.F., Fuchs, V.R., Jacoby, J.E., et al.: Surgical workloads in a community practice. Surgery 71:315-327, 1972.

Jencks, S.F., Dobson, A.: Strategies for reforming Medicare's physician payments: Physician diagnosis-related groups and other approaches. N Engl J Med 312:1492-1499, 1985.

Juba, D.A.: The Effects of Health Insurance on Absolute and Relative Prices of Physicians' Services. Working Paper #3075-05. Washington, DC. The Urban Institute, 1984.

Kelly, N., Hsiao, W.C., Braun, P., et al.: Extrapolation: The family method for generalizing measures of surveyed services to other services. JAMA 1988 (In press).

Kirchner, M.: Cognitive vs. procedural services: The battle heats up. Medical Economics. October 1984.

Korcok, M.: Medical dollars and data collection, recollection, Part I: The evolution of fees. Can Med Assoc J 112:623-625, 1975.

Korcok, M.: Medical dollars and data; collection, recollection, Part II: Fee schedules and income disparities. Can Med Assoc J 112:995-996, 1975.

Kruskal, J.B., Wish, M.: Multi-dimensional Scaling. Beverly Hills, CA. Sage Publications, 1978.

Little, R.J.A., Rubin, D.B.: Statistical analyses with missing data. New York. Wiley, 1987.

Lowe, C.U.: The consensus development program: Technology assessment at the National Institutes of Health." Br Med J 280:1583-1587, 1980.

Luft, H.S.: Health Maintenance Organizations. New York. Wiley, 1981.

Lundberg, G.D.: How should physicians be paid? JAMA 254:2638-2689, 1985.

Mendenhall, R.C.: Medical Practice in the United States. Princeton. The Robert Wood Johnson Foundation, 1981.

Mitchell, J.B.: Alternative Methods of Describing Physician Services Performed and Billed: Final Report on HCFA Grant 500-81-0054. Chestnut Hill, MA. Health Economics Research, 1984.

Mitchell, J.B., Cromwell, J., Calore, K.A., et al.: Packaging physician services: Alternative approaches to Medicare Part B reimbursement. Inquiry 24:324-340, 1987.

Monsoma, G.N.: Marginal revenue and the demand for physicians' services. In Empirical Studies in Health Economics Klerman, H. ed. Baltimore. John Hopkins Press, 1970.

Mosteller, F., Tukey, J.W.: A method of direct assessment. In Data Analysis and Regression: A Second Course in Statistics. Reading, MA. Addison-Wesley Publishing Company pp. 133-163, 1977.

Mulkay, M.: Consensus in science. Soc Sci Inf 17:107-122, 1978.

Nichols, K. Guild: The de-inistitutionalization of technical expertise. In Scientific Expertise and the Public. Skoie, H. ed. Oslo. Institute for Studies in Research and Higher Education, 1979.

Office of Technology Assessment, U.S. Congress: Payment for Physician Services: Services for Medicare, OTA-H-294. Washington, D.C. U.S. Government Printing Office, February 1988.

Owens, M.: Are you still losing out to inflation? Med Econ 61(19):181-190, 1984.

Owens, M.: Doctor's earnings; the year of the big surprise. Med Econ 62(18):195-215, 1985.

Owens, M.: Doctor's earnings: On the rise again? Med Econ 64(18):212-237, 1987.

Pauly, M.V.: Doctors and Their Workshops. Chicago. University of Chicago Press, 1980.

Paringer, L.: The Effects of the Medicare Economic Index on Reasonable Fees: Evidence from California. Working paper #1306-01-04. Washington, D.C. The Urban Institute, 1981.

Perry, S., Kalberer, J.T.: The NIH consensus-development program and the assessment of health care technologies. New Engl J Med 303:169-172, 1980.

Pfizenmayer, R.F.: Antitrust law and collective physician negotiations with third parties: The relative value guide object lesson. J Health Polit Policy Law 7:128-162, 1982.

Physician Payment Review Commission. Medicare Physician Payment: An Agenda for Reform. Annual Report to Congress No. 68-227. Washington, D.C. U.S. Government Printing Office. March, 1987.

Physician Payment Review Commission. Annual Report to Congress. Washington, D.C. Physician Payment Review Commission, 1988.

Pollard, M.: Antitrust and physician payment. In Report on Conference: Reforming Physician Payment. Washington, DC. Institute of Medicine, 1984.

Reinhardt, U.E.: Physician Productivity and the Demand for Health Manpower. Cambridge. 1975.

Reinhardt, U.E.: The Compensation of Physicians: Approach Used in Other Countries. Final Report to HCFA on DHHA/HCFA Grant No. 95-D-97309/2. Washington, D.C. December 1984.

Rice, T.: The impact of changing Medicare reimbursement rates on physician-induced demand. Med Care 21:803-815, 1983.

Roback, G., Mead, D., Randolph, L.: Physician Characteristics and Distribution in the U.S., 1986 Edition. Chicago. American Medical Association, 1986, p 290.

Roberts, M.J., Thomas, S.R., Dowling, M.J.: Mapping scientific disputes that affect public policymaking. Sci Tech Human Values 9:112-122, 1984.

Roe, B.: The UCR boondoggle: A death knell for private practice? N Engl J Med 305:41-45, 1981.

Roe, B.: Rational remuneration. New Engl J Med 313:1286-1289, 1985.

Roper, W.L.: Statement before th Subcommittee on Health of the Committee on Ways and Means, U.S. House of Representatives. U.S. Dept. of Health and Human Services, Health Care Financing Administration, 1988.

Samuelson, P.A.: Foundations of Economic Analysis. New York. Atheneum Publishers, 1972.

Sellin, T., Wolfgang, M.: The Measurement of Delinquency. New York. Wiley, 1964.

Sloan, F.A., Cromwell, J., Mitchell, J.B.: Private Physicians and Public Programs. Lexington, MA. D.C. Heath and Company, 1978.

Sprachman, S., Rosenbach, M., Burich, M., et al.: Physician Practice Costs and Income Survey. Final Methodological Report on HCFA Contract No. 500-83-0025. Washington, D.C. December 1985.

Sprachman, S., Rosenbach, M.: Report to Respondents Participating in the Physician's Practice Cost and Income Survey. Chicago. University of Chicago, National Opinion Research Center. September, 1986.

Special Committee on Aging, U.S. Senate: Medicare: Paying the Physician - History, Issues, and Options. Washington, D.C. Special Committee on Aging, March, 1984.

Steinwald, B.: Hospital based physicians: Current issues and descriptive evidence. Health Serv Res 2:63-75, 1980.

Stevens, S.S. ed.: Psychophysics: Introduction to its Perceptual, Neural, and Social Prospects. New York. John Wiley & Sons Inc., 1975.

Subcommittee on Health of the Committee on Ways and Means, US House of Representatives: Proceedings of the Conference on the Future of Medicine. US House of Representatives, 1984.

Surgery in the United States: A Summary Report of the Study on

Surgical Services for the United States. Baltimore. RR Donnelly and Sons, 1975.

The Medical Protective Company, Fort Wayne, Indiana: Physicians Rate Classes. Fort Wayne. The Medical Protective Company, July 1985.

Wechsler, H.: Handbook of Medical Specialties. New York. Human Sciences Press, 1976.

Winer, B.J.: Statistical Principles in Experimental Design. New York. McGraw-Hill 1971, pp 283-287.

Worthington, N.L.: The measurement and implications of hospital teaching status. Unpublished doctoral dissertation. Boston. Harvard University School of Public Health, 1982.

Zuckerman, S., Pope, G.C.: The Development of an Interim Geographic Medicare Economic Index. Final Report No. 17-C-9875/1-03 to the Health Care Financing Administration. December 1987.

1985 Report on Medical Fees in the Los Angeles Area. Los Angeles. PDS Publishing, 1986.

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